1995 Index for *Missouri Epidemiologist*

KEY

J/F95 = January/February 1995
J/A95 = July/August 1995
M/A95 = March/April 1995
M/J95 = May/June 1995
S/O95 = September/October 1995
N/D95 = November/December 1995

Division of Environmental Health and Epidemiology Telephone and HOTLINE Numbers

AIDS HOTLINE	(800) 533-2437
Childhood Lead Poisoning Program	(800) 575-9267
Communicable Disease Bulletin Board	(800) 213-9723
	(573) 526-5324
	(573) 526-7668
Communicable Disease Consultation	(573) 751-6113
Communicable Disease FAX on Demand	(800) 210-6225
	(573) 526-7668
Communicable Disease Reporting	(800) 392-0272
Community Environmental Health	(573) 751-6095
Division of Environmental Health and Epidemiology	(573) 751-6080
Environmental Epidemiology	(800) 392-7245
	(573) 751-6102
Immunization	(573) 751-6133
Immunization Tracking System (MITS)	(800) 699-2313
Occupational Fatality HOTLINE	(800) 392-7245
Office of Epidemiology	(573) 751-6477
Radiological Health	(573) 751-6160
Radon HOTLINE	(800) 669-7236
Sexually Transmitted Diseases/HIV	(800) 359-6259
Tuberculosis Control	(800) 611-2912
	(573) 751-6122
Vaccines For Children Program	(800) 219-3224
Veterinary Public Health	(573) 751-6136

Missouri EPIDEMIOLOGIST

Volume XVII, Number 1 *January–February 1995*

Statewide Private Well Water Survey

R. Lynn Young
Bureau of Community Environmental Health

During the flood of 1993, many private wells were inundated with flood waters. This raised many questions. Were these wells contaminated? Was the ground water contaminated? Were wells not directly flooded but in nearby areas affected?

These and many more questions were raised concerning groundwater. Early sample results showed that most of the wells directly affected by the flood waters were contaminated with coliform bacteria. These questions and early results inspired the nine states most affected by flooding (Illinois, Iowa, Kansas, Minnesota, Missouri, Nebraska, North Dakota, South Dakota and Wisconsin) to work together with the Centers for Disease Control and Prevention (CDC) to develop a protocol to sample wells from every county in the nine-state region. This survey is the largest well survey ever conducted in the history of Missouri and the United States.

There were four goals to be achieved with the survey:

- to estimate the percentage of contamination in each state;
- to provide information on the within-state and within-county distribution of microbiological and contamination by a few specific chemicals;
- to obtain data on levels of background contamination by sampling areas not affected by the flood; and
- to obtain objective data on well construction, operation and maintenance for use in developing cost-effective solutions to contamination.

A minimum of eight samples were to be collected from each county. A grid system developed by CDC was used for

(continued on page 2)

A special message from the director.....

When the Missouri Department of Health completed its private well water survey, results revealed that over 50 percent of the wells tested were contaminated.

Because of this high percentage of contamination, I would encourage you to inquire into your patient's water source when they present with symptoms of gastrointestinal illness. If their source is a private well, cistern or pond filter system, encourage them to have their water tested. As you know, it will do little good to treat the symptoms if the source of infection is not identified and corrected.

For questions concerning private well water testing, water disinfection or boiling, technical information or more information on the study, please call (800) 644-1210 or (314) 751-6096.

Coleen Kivlahan, M.D., M.S.P.H.
Director
Department of Health

Inside this Issue...

(continued from page 1)
sample site selection to ensure that the wells were selected at random. The major criteria for a well's acceptability to be sampled was that people were using water from the well for drinking purposes.

Of the 938 sites selected for sample collection, the Department of Health was successful in collecting samples from 861 wells. Rural water districts were the predominant reason for the inability to find suitable wells in some areas.

Test results are shown in Figure 1. Each of the wells were tested for:

- **Coliforms**—A special group of bacteria commonly found in the intestinal tract of warm-blooded animals. Because of this association, coliforms serve as an indicator of fecal contamination. Microorganisms in digestive tract wastes can cause illness with symptoms of nausea, vomiting, abdominal cramps, diarrhea or fever.
- ***E. coli***—A specific member of the coliform family. This organism is closely associated with human fecal waste and presents a real risk of intestinal illness as *E. coli* is considered a human pathogen. Symptoms of illness are similar to those associated with coliforms.
- **Nitrates**—One chemical form of nitrogen, which is essential for making protein in our bodies. Bacteria in the digestive tract of young children can convert nitrate to nitrite, which can be absorbed into the blood where it interferes with moving oxygen from the lungs to body tissues. Signs of nitrate poisoning include fatigue, lack of stamina and, in severe cases, bluish color of fingertips, toes and lips.
- **Atrazine**—A herbicide used for weed control on cropland. It is the most common agri-chemical used in the United States. Health concern about atrazine centers on its cancer-causing potential. Increased cancer risk would require long-term exposure to contaminated water or occupational exposure to concentrated forms of atrazine.

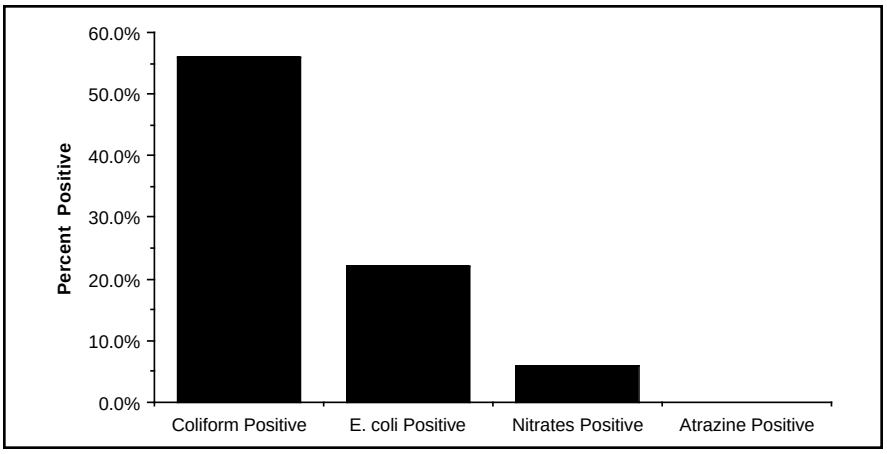


Figure 1. Percent of contaminated water samples from private well water survey by contaminate, Missouri, 1994.

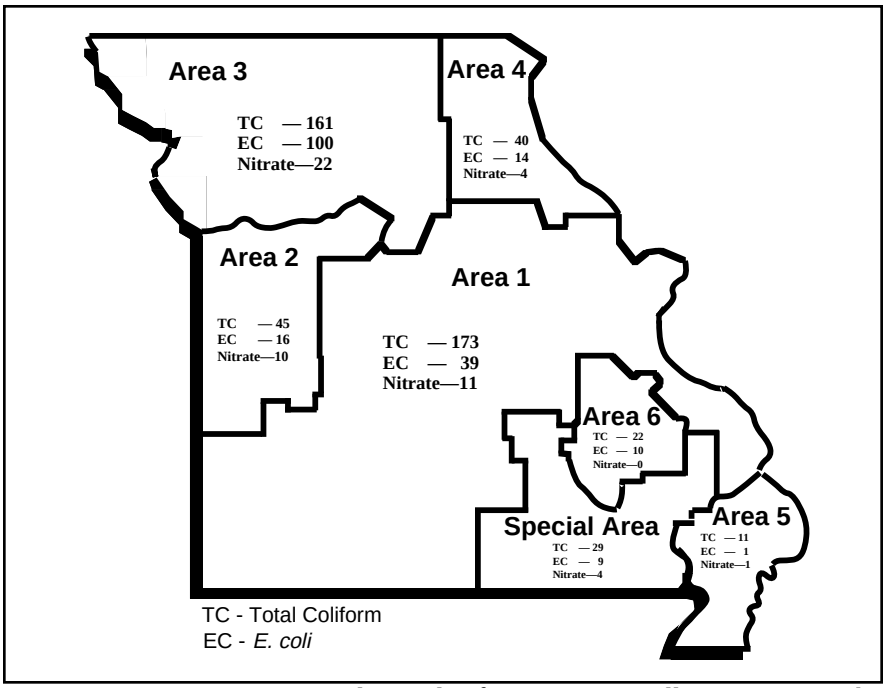


Figure 2. Positive water sample results from private well water survey by hydrogeological area, Missouri, 1994.

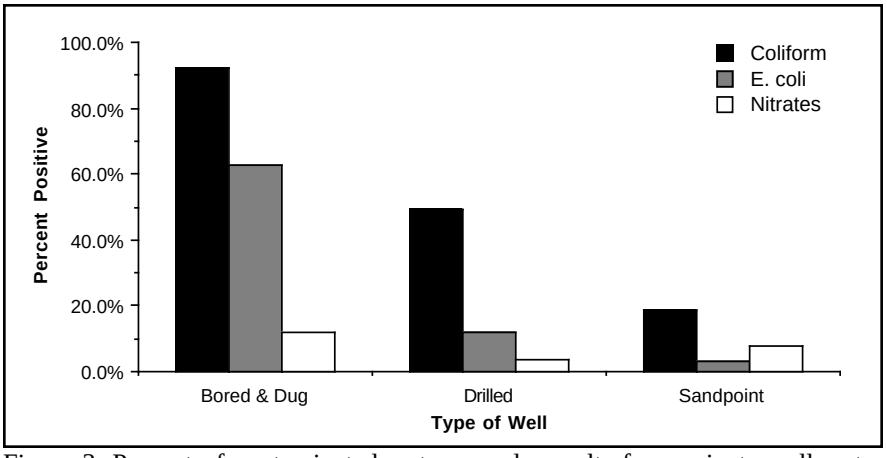


Figure 3. Percent of contaminated water sample results from private well water survey by well type, Missouri, 1994.

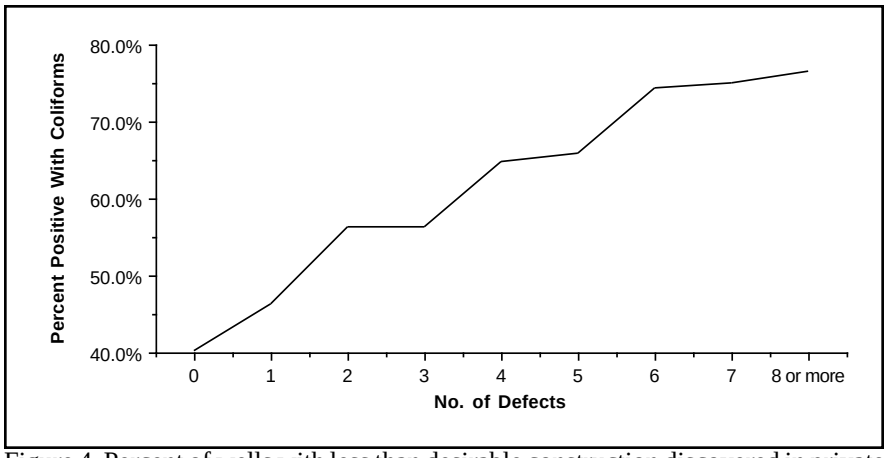


Figure 4. Percent of wells with less than desirable construction discovered in private well water survey, Missouri, 1994.

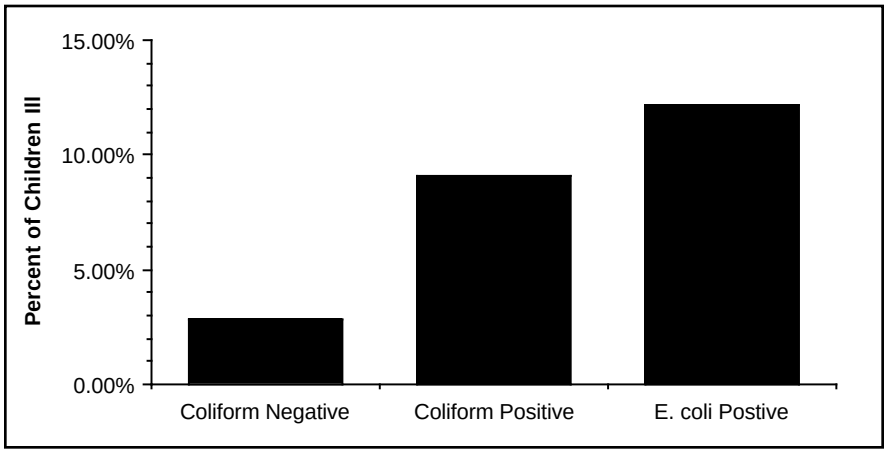


Figure 5. Percent of children less than 6 years of age reporting illness in private well water survey by contaminant, Missouri, 1994.

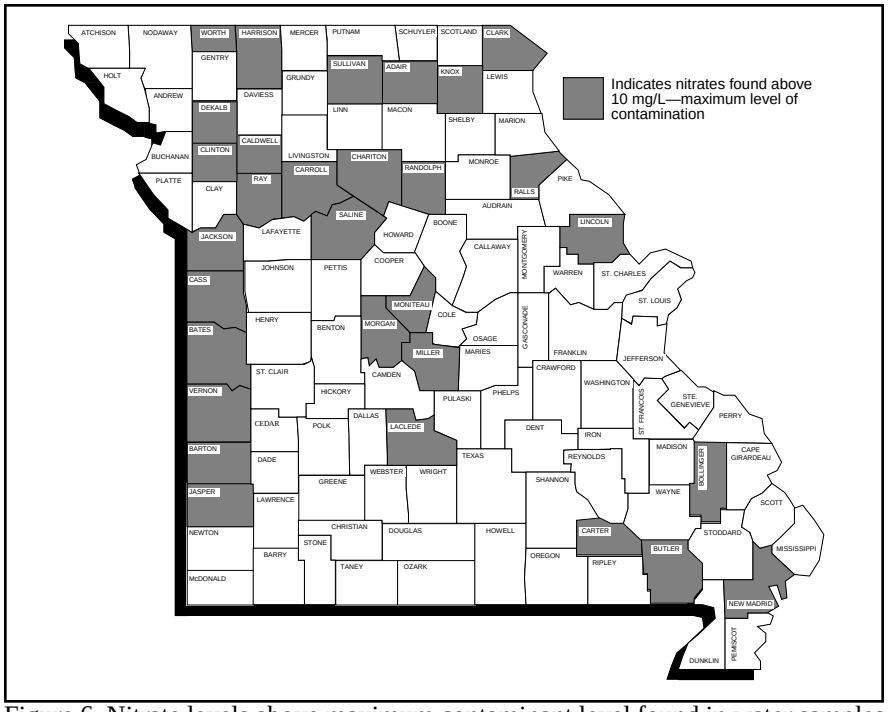


Figure 6. Nitrate levels above maximum contaminant level found in water samples obtained in private well water survey, Missouri, 1994.

Attention was also given to Missouri areas based upon geological information and well construction standards, as depicted in Figure 2.

Three basic types of well construction were found in the state:

- **Drilled wells**—Generally deep wells, greater than 100 feet, found in limestone formations throughout Missouri;
- **Driven or sandpoint wells**—Shallow wells found in river bottoms and the Bootheel area. This type of well is typically installed by individual landowners driving a pipe 15–30 feet into sandy soils;
- **Bored or dug wells**—Shallow (less than 50 feet deep), large diameter wells found in the glacial till areas of north Missouri and along the prairie region of western Missouri.

Some of the most important information gained from the survey was derived from reviewing laboratory results based on well type. See Figure 3. Over 90 percent of the bored and dug wells tested positive for total coliform, and in excess of 60 percent showed direct fecal contamination by testing positive for *E coli*. These alarming results were the reason why the Department of Health opted to release Missouri results of the survey in advance of CDC release of the nine-state composite expected sometime in early 1995. This was coordinated through CDC and with the knowledge of the other states involved.

Data gathered from the questionnaire along with sample results were analyzed by well type. For dug and bored wells, no significant differences were found between or within any variable, as the coliform results were overwhelmingly positive. For drilled wells, numerous factors were significantly associated with coliform results including: depth, age, type of pump and the distance of the well from a septic tank lateral field. Wells with less than desirable construction, based on the information gathered from the survey, showed that as the number of

(continued on page 5)

Arboviral Surveillance 1994

F. T. Satalowich, D.V.M., M.S.P.H.
Bureau of Veterinary Public Health

During the summer of 1994, active surveillance systems were operational for human and equine cases of St. Louis Encephalitis (SLE), Western Equine Encephalitis (WEE) and LaCrosse Encephalitis (LAC), and for arboviral activity in sentinel chicken flocks, wild bird and mosquito populations as reported in the August—October 1994 issue of the *Missouri Epidemiologist*. Grant funding for this endeavor was provided by the Centers for Disease Control and Prevention (CDC). Provided here are the results of this 1994 surveillance.

Results of human and equine arbovirus surveillance activity were reported to the Bureau of Veterinary Public Health on a weekly basis. Specific hospitals and human and animal health care providers were contacted on a routine basis over a 20-week period. Reports indicated that there were no human nor equine arboviral cases during 1994.

The surveillance for arboviral activity via sentinel chicken flocks consisted of the analysis of 686 chicken sera from five sentinel chicken flocks (ten chickens per flock) for 22 weeks. Analysis was conducted by the University of Missouri Veterinary Diagnostic Laboratory. No IGM antibodies specific for SLE, WEE or LAC were detected. These results indicated that arboviral activity did not occur in the areas where the sentinel chickens were located.

Active surveillance for arbovirus activity in the wild bird population consisted of the collection from eight counties (Cape Girardeau, Clay, Cole, Jackson, Marion, Pettis, Ralls and St. Charles) of 501 wild birds comprising 17 species. The majority of birds were English Sparrows (77.0 percent). Other species collected included Common Grackles (8.2 percent), Red-winged Blackbirds (5.2 percent) and European Starlings and Boat-tailed Grackles (2.6 percent). Sera from all birds tested negative for SLE, LAC and WEE virus induced IGM antibodies. This indicated that arboviral activity did not occur in birds in these areas.

Arbovirus surveillance in vector mosquito populations commenced with adult mosquito collections on May 15, 1994, and all areas were fully operational by mid-June. Trapping was accomplished with CO_2 baited CDC Miniature and EVS Light Traps, Reiter Gravid Traps and also through hand collection at selected resting stations by aspirator. Collection areas included the Mississippi River flood plain from Hannibal south to Cape Girardeau, the Central Missouri River flood plain from Booneville to Hermann (including Columbia and Jefferson City), the western area of the Missouri River flood plain from north of St. Joseph to the eastern boundary of Kansas City, and southwest Missouri, primarily the Springfield area. Mosquito populations in most areas continued to be low to average, and much below last year's levels.

The Virology Laboratory at Southeast Missouri State University provided analysis for WEE, SLE and LaCrosse virus in vector mosquitoes. There were 3,789 pools of adult mosquitoes tested for WEE and SLE, 729 pools tested for LAC and 337 pools tested for EEE by antigen capture ELISA. Pools included 94,685 specimens of *Culex pipiens, Culex restuans, Culex salinarius, Culex tarsalis, Aedes triseriatus* and *Aedes albopictus*. All tests were negative, indicating that arboviral activity was not occurring or could not be detected in mosquitoes in these areas. Nuisance adult mosquito populations were low, with levels reduced from what was observed last year. The nuisance mosquitoes caught in the light traps were saved for species determination and population studies. Throughout the season, 54,472 specimens of nuisance mosquitoes, comprising 27 species, were identified. *Aedes vexans* and *Culex erraticus* accounted for 87.5 percent (56.5% and 31.0%, respectively) of the composite.

Based on the results from all surveillance systems, it was concluded the arboviral activity was not present or was below detection level. While flood-related arboviral activity was not detected in Missouri in 1994, it cannot be concluded that danger from arboviruses does not exist. Epidemiological and entomological intelligence tells us that major outbreaks of arboviral disease normally occur two to seven years after a major flood. There is no doubt that arboviruses are present in nature since sporadic disease cases continue to occur. Time is needed for the virus to amplify in mosquitoes and in lower vertebrates (such as wild birds) before the level of virus activity is high enough to detect and to cause disease outbreaks in equines and humans, which normally serve as the dead-end hosts for the virus.

Since total funding for surveillance in 1995 was not secured, the scope of surveillance will be smaller. It will continue at a magnitude to allow for the detection of arboviral activity.

CORRECTION:

Table 1. Definitions of Scabies Infestations printed on page 15 of the November-December 1994 issue of the *Missouri Epidemiologist* contained an error. Animal-transmitted scabies should read:

Canine-transmitted scabies: caused by the *Sarcoptes scabiei* var *canis* species of mite from dogs; the mite does not reproduce or complete its life cycle on humans and thus burrows are not created; not usually transmitted person to person; as a rule self-limiting in humans.

Update on Serologic Testing for Lyme Disease

Eric Blank, Dr.P.H.
State Public Health Laboratory

Lyme disease is a difficult disease to diagnose. Patients may be unaware of tick bites and may not observe the characteristic erythema migrans lesion. In some cases, the lesion may not develop. Clinical signs in early and late disease are non-specific ranging from mild flu-like symptoms (headache, myalgia, low-grade fever, malaise) in early disease to arthritis, cardiac abnormalities and various neurological manifestations developing years after exposure. Until recently, serologic tests were found to be of little help in assisting the clinician with the diagnosis of Lyme disease.

The first National Lyme Disease Serology Testing Conference, held in 1990, reported the problems with the serologic tests available at the time. They were non-specific for antibodies to the causative agent, *Borrelia burgdorferi*. Test reagents and protocols were not standardized, so different laboratories could not agree on test results for the same patient specimens. Cultural confirmation of cases was rare, consequently, the serologic response to *B. burgdorferi* infection was not well characterized or understood making interpretation of serologic test results questionable if not controversial. This conference ended with a charge to researchers, clinicians, the public health community and industry to improve our understanding of the disease by increasing efforts to culturally confirm cases; improve and expand the characterization of *B. burgdorferi* from those cases to develop better, more standardized serologic tests; and to serologically follow culturally confirmed cases to better understand the etiology of the disease and the immunologic response to it.

In October 1994, the Second National Lyme Disease Serology Testing Conference was held. Significant progress has been made in our understanding of the disease and the immunologic response. The antigenic characterization of *B. burgdorferi* has been developed and a standardized nomenclature has been introduced. Using these characterized antigens, immunoblot assays (Western blot) have been developed for both IgM and IgG antibodies, and sufficient data was reported to propose specific interpretive criteria for IgM and IgG immunoblots. Where the first conference ended with the recommendation that serologic testing for Lyme disease be sparingly employed, the second conference recommended a standardized testing protocol that uses the appropriate immunoblot to confirm the results of a positive serologic screening test for Lyme disease.

Despite the progress that has been made, Lyme disease still presents a diagnostic challenge. The serologic response in late Lyme disease (i.e., infection greater than one year) is not well documented or completely understood. The effect of antibiotic therapy on the immunologic response is not completely known. Standardization of immunoblot reagents will take time. Meanwhile, new tests using new technologies (PCR, genetic probes, etc.) are constantly being developed.

Nevertheless, meaningful serologic testing for Lyme disease is now possible, which will improve diagnosis, treatment and understanding of this disease. The State Public Health Laboratory will be conducting an assessment of the need to provide this testing as a part of an active disease surveillance program, and as a reference diagnostic testing service.

For further information, contact Dr. Eric Blank at the State Public Health Laboratory, P.O. Box 570, Jefferson City, MO 65102-0570 or call (314) 751-3334.

Well Water Survey

(continued from page 3)
construction or location defects increased so did the percent coliform positive. See Figure 4. This information has validated the department's long-held belief that proper construction is an important part of having a safe water supply.

Of the 2,578 individuals surveyed, only 73, or 2.8 percent, reported diarrheal illness during the two weeks prior to the survey. As shown in Figure 5, 12.2 percent of the children less than 6 years of age drinking *E. coli*-positive water reported three or more loose or watery stools within one 24-hour period during the two weeks prior to the survey. This compares to only 2.9 percent of children less than 6 years of age drinking coliform-negative water reporting illness.

Although nitrates are generally associated with northern Missouri and those western counties of Missouri's prairie region, the survey showed that it is possible for nitrates to be a problem in the Ozarks, therefore, no part of the state should be considered immune to nitrate problems. See Figure 6.

The significance of this information resulted in the Department of Health scheduling a meeting on October 11, 1994, for those who had been identified as interested parties. This was then followed by a news release that was issued that afternoon. In the news release, the department stressed the importance of having private wells tested annually for bacteriological contamination. The department has also established a toll-free number, (800) 644-1210, to assist private well owners with questions.

Presently, the department is working with CDC in order to develop a protocol for conducting a validation survey and to help better define the sources of contamination.

Seymour Locker Plant

Roger Gibson
Bureau of Community Environmental Health

Gary Boone
Southwestern District Health Office

On August 4, 1994, the Department of Health (DOH) Southwestern District Office, Bureau of Community Environmental Health received a request from the United States Department of Agriculture (USDA) to assist them in the embargo and condemnation of the contents of the Seymour Locker Plant in Seymour, Missouri. In response, DOH conducted its own inspection during which the following conditions were found:

- excessively moldy meat;
- advanced liquid decomposition and putrefaction of meat;
- extreme infestation of maggots in several walk-in coolers;
- lack of minimum refrigeration temperatures;
- large amounts of methane and other noxious and extremely offensive gases;
- some inoperable refrigeration units;
- meat and meat products that had frozen, thawed and refrozen;
- rodent infestation, nesting and harborage;
- a portion of the ceiling fallen had in;
- commingled wild game (deer, woodchuck) with beef and pork;
- extreme accumulation of ice in walk-in freezers.

Because of the presence of regulated wild game being present, the Department of Conservation was notified and joined in the investigation and subsequent regulatory action.

The Seymour Locker Plant was an established, long-term business located on the city square in Seymour. Since the plant was a custom-kill, custom-wrap facility that did not sell to the general public, regulatory authority resides with the Missouri Department of Agriculture and the USDA. The facility's contents were already under a Notice of Detention issued by the USDA; however, the jurisdictional procedure for the USDA requires a minimum of 21 business days. The DOH procedural efforts can proceed faster and, therefore, the USDA requested the DOH to assist in the rapid disposal of the unwholesome, adulterated and decomposing products.

Gary Boone, Sanitarian Supervisor in the Southwestern District Health Office was the Missouri DOH point person who provided assistance to the USDA. He was assisted by sanitarians Sue Burton and Jerry Bertoldie, who are state employees assigned to the Southwestern District Health Office. Because of the very large amount of product and the extremely advanced state of decomposition, sanitarian Boone worked with the mayor and the local fire department to have self-contained breathing equipment available for individuals entering the refrigeration units. After several abortive attempts, the three involved regulatory agencies and the owner's representatives made arrangements to have a rendering company pick up the inventory. Again, after several schedule delays, removal of the products began on August 11.

Sanitarian Boone stated the conditions were the worst he had ever seen in his career, which has spanned 39 years in both military and state governmental areas.

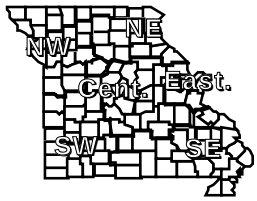
Approximately 8,000 pounds of product were removed from the locker plant. At that point, the rendering plant truck was at capacity, leaving approximately 200 pounds remaining. Five days later, after continuous interaction with the plant owner's representative, the remaining 200 pounds were removed. At that time, DOH was informed by the owner's representatives that there were no plans to reopen the establishment.

On September 13, 1994, the Southwestern District Health Office was notified by the public that not all of the product had been removed. Upon further investigation, an additional 2,000 pounds of product were discovered. This product was in another room off a walk-in freezer which was not previously accessible because of the tremendous accumulations of ice which had subsequently melted. In addition, there were numerous rental lockers containing various products with old locks or locks that had rusted shut, and the owner's representatives had forced these lockers open. During the intervening days, there was no refrigeration in the facility. This product was also picked up by a rendering plant truck. With the completion of the final removal, the Missouri DOH had fulfilled its obligation to the USDA.

Before the situation was resolved, numerous radio and television stations and newspapers had covered the events. In addition, the Associated Press sent out a story on the locker plant on its national wire service, and at least one network included the story on its national newscast.

At the time this goes to print, the Seymour Locker Plant is still closed, and the owner has filed for bankruptcy. The action of the DOH prevented 10,200 pounds of unwholesome and contaminated product from being introduced into numerous private homes where the risk of illness would have been significantly increased. The DOH spent in excess of 80 person hours and drove in excess of 1,000 miles to support the request of the USDA and to protect the health of the Seymour community.

Proper maintenance of the physical plant and equipment would have prevented the lost of this meat. With the advanced decomposition that had occurred, the only alternative remaining for the USDA and DOH was the condemnation and eventual disposal of the product.



Missouri Department of Health
Division of Environmental Health and Epidemiology
BIMONTHLY MORBIDITY REPORT

Reporting Period *
September - October, 1994

	Districts							KANSAS CITY	ST. LOUIS CITY	ST. LOUIS CO.	SPGFLD GREENE CO.	2 MONTH STATE TOTALS		CUMULATIVE		
	** NW	NE	CD	SE	** SW	** ED	*** OTHER					1994	1993	FOR 1994	FOR 1993	5 YR MEDIAN
Vaccine Preventable Dis.																
Chickenpox	128	22	18	160	72	20		0	0	0	1	421	437	8514	7900	8158
Diphtheria	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Hib Meningitis	0	0	0	0	0	0		0	0	0	0	0	4	4	9	37
Hib Other Invasive	0	2	0	0	0	0		0	0	0	0	2	24	37	97	**
Influenza	0	0	0	0	0	0		0	0	0	0	0	0	158	247	217
Measles	0	0	0	0	0	0		0	0	0	0	0	0	160	1	1
Mumps	5	0	0	3	0	0		1	0	0	0	9	12	36	37	37
Pertussis	2	0	1	1	3	2		1	1	0	0	11	45	41	125	107
Polio	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Rubella	0	0	0	0	0	0		0	0	0	0	0	0	2	1	1
Tetanus	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Viral Hepatitis																
A	2	2	33	1	5	35		4	36	26	5	149	231	498	1295	621
B	3	0	2	4	3	1		5	41	5	2	66	109	410	501	501
Non A - Non B	2	0	1	0	1	0		0	0	0	0	4	2	17	23	23
Unspecified	0	0	0	0	0	0		0	0	0	0	0	4	0	17	17
Meningitis																
Aseptic	3	0	10	1	5	2		1	1	4	7	34	94	140	236	228
Meningococcal	4	1	0	1	0	0		0	0	0	1	7	5	50	31	30
Other	0	0	0	1	1	0		0	0	1	0	3	8	44	57	33
Enteric Infections																
Campylobacter	7	3	27	10	4	6		11	6	12	9	95	115	533	532	526
Salmonella	9	2	44	26	8	4		3	10	12	3	121	125	530	412	476
Shigella	15	0	12	7	1	4		9	15	5	6	74	86	376	573	368
Typhoid Fever	0	0	0	0	0	0		0	0	0	0	0	0	1	2	2
Parasitic Infections																
Amebiasis	0	0	0	0	0	0		0	3	1	0	4	15	25	44	21
Giardiasis	21	8	37	13	12	13		16	11	26	21	178	191	578	592	656
Sexually Transmitted Dis.																
AIDS	9	1	8	4	9	3	5	21	32	23	5	120	115	621	1532	528
Gonorrhea	64	22	84	93	57	21		576	717	426		2060	2977	10325	11161	14869
Genital Herpes	28	19	54	26	47	42		85	88	112		501	688	2928	3134	2779
Nongonoc. urethritis	14	12	29	25	3	3		295	573	37	23	1014	1129	5099	5383	5876
Prim. & Sec. syphilis	0	0	0	6	0	1		8	81	19	0	115	318	837	1243	433
Tuberculosis																
Extrapulmonary	0	0	0	1	0	1	0	2	2	3	0	9	10	34	36	36
Pulmonary	2	0	4	4	0	1	2	5	12	6	2	38	35	173	180	169
Zoonotic																
Animal Bites	120	29	71	145	71	54		0	0	1	10	501	931	3866	5344	4716
Psittacosis	0	0	0	0	0	0		0	0	0	0	0	0	4	1	0
Rabies (Animal)	1	0	0	3	0	0		0	0	0	0	4	11	17	30	30
Rocky Mtn. Sp. Fever	0	0	3	0	1	0		1	0	0	0	5	5	16	19	24
Tularemia	0	1	3	3	0	0		0	0	0	0	7	4	23	16	32

Low Frequency Diseases

Anthrax
Botulism
Brucellosis
Chancroid
Cholera
Cryptosporidiosis
Encephalitis (infectious)
Encephalitis (viral/arbo-viral)
Granuloma Inguinale
Kawasaki Disease - 5
Legionellosis - 9
Leptospirosis
Lymphogranuloma Venereum
Malaria - 1
Meningococcal, Other - 2
Plague
Rabies (human)
Reye Syndrome
Rheumatic fever, acute
Toxic Shock Syndrome
Trichinosis

Outbreaks

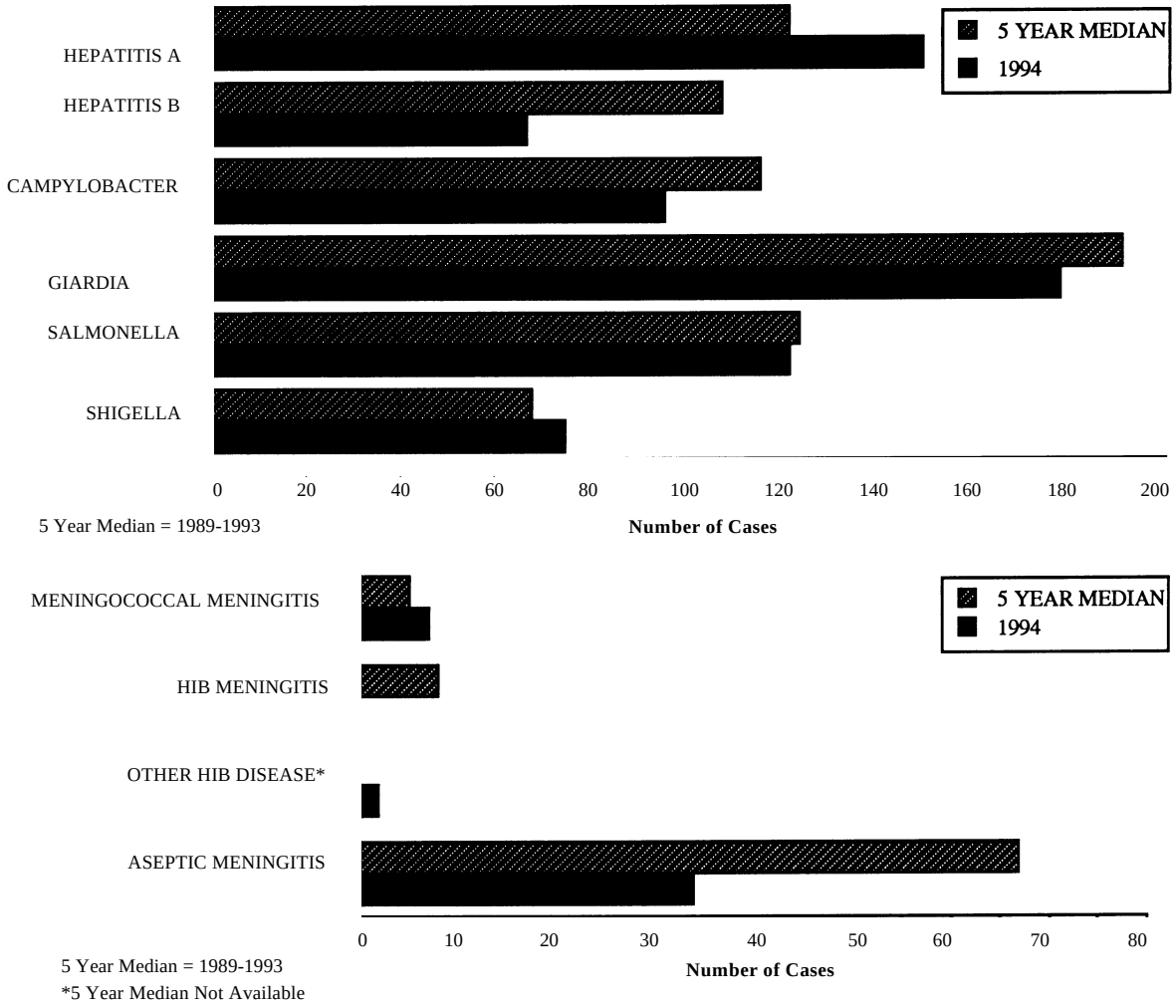
Foodborne - 6
Waterborne
Nosocomial
Pediculosis
Scabies - 3
Other
ARI - 1
Legionellosis - 1
Shigella - 1

*Reporting Period Beginning September 4, Ending October 29, 1994.
**Totals do not include KC, SLC, SLCo, or Springfield
***State and Federal Institutions
** Data not available

Due to data editing, totals may change.

TEAR OUT FOR FUTURE REFERENCE

DISEASE REPORTS, SEPTEMBER/OCTOBER
1994 AND 5 YEAR MEDIAN



VIRAL HEPATITIS

During the September/October bimonthly period, hepatitis A incidence continued to fall to pre-1992 levels. It decreased by 35.5%, from 231 cases during September/October 1993 to 149 cases during September/October 1994. This is 23.1% above the five year bimonthly median of 121 cases. Hepatitis B cases decreased for the period and fell 39.4%, from 109 in 1993 to 66 in 1994. The number of cases fell 38.3% from the five year bimonthly median of 107 cases.

ENTERICS

Campylobacter decreased by 17.4%, from 115 cases during the bimonthly period in 1993 to 95 cases in 1994. The previous year is the five year median. Salmonella at 121 cases, has fallen 3.2% from 125 cases in 1993, and 1.6% from the five year median of 123 cases. Shigellosis decreased 14.0% from 86 cases in 1993 to 74 cases in 1994. It is up 10.4% from the five year median of 67 cases.

PARASITES

There were 178 giardiasis cases reported in 1994 during the bimonthly period, which is 6.8% less than the 191 cases reported in 1993. That year is also the five year median.

MENINGITIS

Aseptic meningitis decreased by 63.8% to 34 cases in 1994 from 94 cases in 1993. A decrease of 49.2% from the five year median of 67 cases. Meningococcal meningitis increased by 40.0% to 7 cases in 1994 from 5 cases in 1993. The five year median is also 5 cases.

HIB DISEASE

There were no cases of Hib meningitis reported for the period in 1994, a decrease of 100.0% from the 4 cases in 1993. It is also a decrease of 100.0% from the five year median of 8 cases. Other invasive Hib decreased by 91.7%, from 24 cases in 1993 to 2 cases in 1994. There is no bimonthly five year median for other invasive Hib disease.

1994 Index to *Missouri Epidemiologist*

KEY

J/F94 = January/February 1994
M/A94 = March/April 1994
M/J94 = May/July 1994
A/O94 = August/October 1994
N/D94 = November/December 1994

Division of Environmental Health and Epidemiology Telephone and HOTLINE Numbers

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Communicable Disease Reporting	(800) 392-0272
Community Environmental Health	(314) 751-6095
Division of Environmental Health and Epidemiology	(314) 751-6080
Environmental Epidemiology	(800) 392-7245 (314) 751-6102
Immunization	(314) 751-6133
Occupational Fatality HOTLINE	(800) 392-7245
Office of Epidemiology	(314) 751-6477
Radiological Health	(314) 751-6160
Radon HOTLINE	(800) 669-7236
Sexually Transmitted Diseases/HIV	(800) 359-6259
Tuberculosis Control	(314) 751-6122
Vaccines For Children Program	(800) 219-3224
Veterinary Public Health	(314) 751-6136

Availability of Electronic Morbidity and Mortality Weekly Report (MMWR) on Internet

Reprinted from the Centers for Disease Control and Prevention (CDC) Morbidity and Mortality Weekly Report (MMWR), January 27, 1995, Volume 44, No. 3.

To increase access to information in the *MMWR*, as of January 27, 1995, the *MMWR* series will be available in an electronic format on the Internet; each week's issue will be available on Friday morning. To access CDC's Internet file servers, users must have Internet access and software that retrieves files by file transfer protocol (FTP) or software that will access the World Wide Web (WWW).

Current and past copies (since January 15, 1993) of the electronic *MMWR* series are available over the Internet in Adobe™ Acrobat™* portable document format (.pdf). To view *MMWR*, a program produced by Adobe, Inc. (Acrobat™ Reader), is required. Different versions of Acrobat™ Reader are available free of charge for computers that use DOS, Macintosh®, UNIX®, and Windows™ operating systems. *MMWR* in .pdf format can be viewed in any of these systems.

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CDC WWW server. Programs that browse the WWW (e.g., Mosaic) allow particularly easy navigation of the Internet. Use WWW software to connect to the *MMWR* WWW pages at either of the following addresses:

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- http://www.crawford.com/cdc/mmwr/mmwr.html To access the *MMWR*, follow the instructions that appear on the screen.

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Infection Control and Communicable Disease Control in the Russian Federation—Report of a Trip

Caryl Collier, R.N., M.P.H., C.I.C.
Bureau of Communicable Disease Control

The American People Ambassador Program requested the Association for Professionals in Infection Control and Epidemiology, Inc. (APIC) to send a delegation to the Russian Federation for the purpose of exchanging information and establishing goodwill between Russian and American counterparts. Following APIC's commitment to this effort, 31 infection control and epidemiology professionals responded to the invitation. The APIC delegation visited Moscow, Novgorod and St. Petersburg, October 2–15, 1994, and exchanged information with government health officials and professionals.

The delegation was briefed on Russian economic, political and social changes at the prestigious Institute of USA and Canada Studies in Moscow. The group shared ideas and solutions to common infection control challenges through roundtable discussions, meetings and hospital visits. Three delegates gave presentations on Principles of Epidemiology, Infection Control Patient Care Practices and Disinfection/Sterilization to nursing students at the Russian Academy of Post-Graduate Education.

The following information was derived from notes taken during briefings and hospital rounds; no written affirmation was received from Russian authorities.

Russian officials are concerned over the increase in infectious diseases, the lack of resources to deal with them, the rising mortality rate and the lowering of the birth rate. In 1980, the birth rate was 13.6/1,000 and in 1993, it was 7.0/1,000. By contrast, the death rate was 11.7/1,000 in 1980 and 16.3/1,000 for the first nine months of 1994. (For 1993, Missouri's birth rate was 14.4/1,000 and death rate was 10.3/1,000.) The neonatal mortality rate is 19/1,000 live births as quoted by the Deputy Director to the Mayor of Novgorod. Life expectancy in Russia is about 72 (plus or minus one to two years) for women and 62 (plus or minus one to two years) for men; however, for men in rural Russia, life expectancy is 54.1 years with life shortened by the effects of alcohol, smoking and trauma. Alcohol and trauma are thought to cause 80 percent of male deaths in small rural villages. Cancer of the stomach and lung are common.

Certain diseases were emphasized by Russian authorities in the three cities, partly because of increased frequency in the presenter's geographical region and partly in response to our questions. Diphtheria cases in the Novgorod Region are the second highest in frequency among all Russian regions. (From 1990–1993, the Russian Federation reported 12,865 cases[1] compared to 13 cases in the United States.[2]) According to Dr. Alexander Savin, Chief of the Infectious Disease Unit at Municipal Hospital #2 in Novgorod, the age distribution for diphtheria is 70 percent adults and 30 percent children. Most of the adult cases are 20–45 years old who are predominantly in the lower socioeconomic class. The mortality rate of diphtheria cases is 3–5 percent. In the first nine months of 1994, 100 cases of clinical diphtheria (no cutaneous disease) and 200 carriers were seen at the hospital. The carrier state is identified in those who actively seek health care, not by outreach screening. Dr. Savin has seen over 1,000 cases of the toxic form of diphtheria with 50 percent having died due to lack of immunization, the unavailability of a good human immune globulin and life support measures. If toxic cases present within five days of onset, Dr. Savin administers horse serum antitoxin intravenously along with corticosteroids to counteract anaphylaxis; he does test for allergy to the equine antiserum.

Outbreaks of diphtheria have been more common in psychiatric hospitals. Hospitals have consequently kept new admissions isolated for some time. The hospital personnel are usually immunized against diphtheria.

Scientists at the Pasteur Institute in St. Petersburg offered these hypotheses regarding the explosive increase in diphtheria since 1986:

- some populations were not reached with the recommended childhood vaccinations;
- the booster dosage interval of five years for children was extended to seven years because it was thought that the antigen in the vaccine was excessive;
- immunity waned in the adult population because of the lack of boosters, which are recommended every ten years;
- a change occurred in the virulence of *C. diphtheriae* strains.

The diphtheria vaccine is considered good quality. It is made in Siberia and Moscow, and is tested by two laboratories, one in Finland and one in England.

Reduction in the diphtheria case rate within the Russian Federation is being approached through several strategies:

- the interval for booster vaccination in children has reverted back to five years (boosters at ages 6, 11 and 16);
- the adult population (30–50 years of age) is required to have the boosters every ten years; those over 50 are not forced, but are highly encouraged to get boosters;
- insurance companies are notified if a person refuses vaccination or prophylaxis; if family members of a case refuse prophylaxis, the children are barred from admission to schools;
- letters have been sent to consuls and travel agencies concerning the need for diphtheria boosters if traveling to Russia;
- the Pasteur Institute, in collaboration with CDC, is working with 70 *C. diphtheriae* strains in Russia and four strains from the United States to do

polymerase chain reaction direct sequencing in order to identify new strain characteristics, which may not be covered in the vaccine. At this point, it is too early to make any general conclusions as to strain variation; in fact, grant funding is needed to continue the work. Russian scientists are also working on tests that will be more sensitive to strain toxin production.

Touring through the 40-bed infectious disease unit in Novgorod, we saw three to four patients per room. Each room was separated from the main hallway by a window wall and each had an anteroom with a pass-through window for serving food and medications. Ultraviolet lights were positioned in each room at near ceiling level for the purpose of killing *C. diphtheriae.*

Relative to other diseases seen in Novgorod, Dr. Savin explained that leptospirosis was seen frequently and resulted in a 20 percent mortality rate. With rats being one of the primary vectors of this organism, great efforts are underway to control the rat population. Patients present with fever of 40˚C and hemorrhage of the sclera, nasal bleeding, pain in the gastrocnemius (the cardinal sign) and anuria in three or four days.

We were informed that chicken eggs in the Novgorod region were 100 percent contaminated with *Salmonella enteritidis.*

Patients presenting with dysentery have routine tests done, among them fecal leukocytes and stool cultures for *Salmonella, Shigella*, and enteropathogenic *E. coli*. They sometimes test for *Yersinia enterocolitica*, but cannot test for *Campylobacter* because the hospital lacks the specialized media. When health professionals in Novgorod and St. Petersburg were asked if they have seen cases of hemolytic uremic syndrome caused by *E. coli* O157:H7, they replied that they were not familiar with the syndrome nor the organism. In St. Petersburg, *Shigella flexneri* was previously thought to have disappeared, but now they have a case rate of 73.1/100,000 population. They are also seeing a lot of cases of *Shigella sonnei*.

An outbreak of *Salmonella haifa* was described by Mrs. Nina Sulova, Head of the Microbiology Laboratory at the Moscow City Center for State Sanitary and Epidemiological Surveillance. The outbreak occurred throughout a five-story building over a two-month period. After extensive investigation of food as the possible common source, all leads were discounted. Finally, the building was closed, people were evacuated and an investigation of the ventilation system was begun. The source of the outbreak was identified as pigeon droppings that had gotten into the air ducts. Investigators concluded that transmission was by airborne particulates alone, not by food. The organism antibiogram showed resistance to all antibiotics except polymyxin. Patients had to be treated with intravenous replacement of fluids due to dehydrating diarrhea.

Novgorod has a high incidence of Lyme disease and Dr. Savin compared it to Connecticut. Lyme disease does not present the same as in the United States. Lyme disease or borreliosis in Europe is carried by *Ixodes ricinus* and in Asia, including eastern "USSR," it is carried by *I. persulcatus.*

Dr. Sergey L. Mukomolov, Chief, Laboratory of Viral Hepatitis at the Pasteur Institute in St. Petersburg, told us that they are able to test for hepatitis A, B, C and D with approximately 1,000 cases of these hepatitis types identified per year. They do not have a test for hepatitis E. Scientists have been working on a second generation, and more recently, a third generation ELISA test for hepatitis C (HCV). There are plans to work on an IgM test for HCV this next year. He related that 80 percent of adults and 30 percent of children in the Russian Federation have had hepatitis A with a case rate of 115/100,000 population.

Hepatitis B vaccine is unavailable, but Russian officials said they currently need 15 million doses for health professionals. Major achievements in research relate to clinical trials of HBV vaccine, which they hope to be able to distribute next year. Vaccines will be marketed directly from the Institute; they are looking for sponsors to support these efforts. Vaccines are independently developed in Russia in order to control costs and are distributed in accordance with World Health Organization recommendations.

Discussions frequently centered on vaccine-preventable diseases (tetanus, diphtheria, measles, mumps, polio, pertussis), hepatitis and HIV. The Russian Federation requires six vaccines in childhood: tetanus, diphtheria, measles (rubeola), BCG for tuberculosis, polio and pertussis. No vaccine is offered for rubella nor for *Hemophilus influenzae* type b. No immune globulin is available for contacts of hepatitis A; no hepatitis B immune globulin for exposures to hepatitis B infected blood and no rifampin is available for prophylaxis against exposures to meningitis caused by *Hemophilus influenzae* type b and *Neisseria meningitidis.*

Tuberculosis occurs primarily in adults. Active cases are cared for in special tuberculosis hospitals. There are eight such hospitals in St. Petersburg. Ordinary families who have a member with active tuberculosis get appropriate treatment early. There was no answer to our question as to whether multi-drug resistant tuberculosis is being identified. Mortality rates for tuberculosis are highest among persons seen in correctional centers and the homeless because they have severe advanced disease. There are no laws, according to the St. Petersburg official, on the management of the homeless with active tuberculosis.

According to a spokesperson in St. Petersburg, good data on sexually transmitted diseases has only accumulated since 1990. There is some disagreement among officials as to the incidence of HIV/AIDS. Some say it is similar to other countries, while others think that Russia has a low incidence. To date, there have been 914 cases of AIDS re-

(continued on page 14)

(continued from page 13)
ported in St. Petersburg, mostly gay men and children. Children with AIDS may have become infected through medical care. There is limited routine testing done for HIV, but 30 percent of some high-risk groups are tested regularly; we were not told which high-risk groups are being tested. Persons testing positive for HIV must go to specialized infectious disease hospitals for care. Contact tracing of HIV cases (going back two years) includes questions as to whether there were invasive procedures or if care was received from a physician (gynecologist, gastroenterologist, etc.) or dentist. There is apparently some concern about the possibility of medical instruments and equipment being the source for HIV transmission.

The identity of HIV-infected persons is kept confidential by the health officials and is not shared with family or employer. However, if the family or household contacts have been voluntarily informed by the infected person that he or she is HIV-positive, then the family or household are encouraged to be tested for HIV. Sexual contacts of persons with syphilis and gonorrhea are followed up; however, according to a St. Petersburg spokesperson, the case rates are not going down.

Infection control is in its infancy as a discipline in Russia. There are no infection control professionals employed in hospitals, but there is a stated need for 25,000 professionals to be trained in infection control and epidemiology within the next five years. There is no paid position for a hospital epidemiologist. Those persons who have the title of epidemiologist work for the government in an overseeing, regulatory capacity. Although there are different levels of expertise in epidemiology, there is no master's degree in epidemiology and no clinical training in hospital epidemiology. One situation noted by Elena Bourganskaia, M.D., M.S. involved an engineer who was responsible for infection control and medical waste disposal within the same hospital.

At one time nosocomial infections were unrecognized as an entity primarily because any acknowledgment of them to the National Surveillance Committee resulted in hospital fines and disciplinary action, but in the last few years, these infections are being recognized. In fact, the Society of Hospital Infections Control was formed in 1992 with the aim of supporting medical personnel in following international norms for infection control activity within health care establishments. We APIC delegates were made honorary members of the Society by Professor Galkin, President of the organization.

In the Russian Federation, the surveillance of communicable diseases is done through a system of hierarchical centers under government direction. The two federal agencies, Ministry of Health and the Sanitary and Epidemiological Surveillance Committee, have head doctors who are almost equal in stature and both report to the Russian ruling authorities. However, only the Surveillance Committee has the responsibility for compiling aggregate reports describing frequencies/distributions of diseases from every region. There are regional Centers of State Sanitary and Epidemiology Control responsible for sanitation and epidemiology in districts within each region. Provincial centers, like Novgorod and Tver, are under the control of the regional centers, but Moscow and St. Petersburg report directly to the Surveillance Committee. In Moscow, there are 11 centers; one center being the hub which controls the activities of the other ten. This main center employs 500 persons and is organized into 16 departments of preventive and sanitary control as well as specific laboratories. Laboratory testing includes the broad categories of:

- sanitation and hygiene,
- chemical, physical tests,
- toxicology,
- bacteriology,
- most dangerous infections,
- virology,
- AIDS diagnostic,
- radiological,
- harmful environmental effects (noise, vibrations).

Each of the ten centers employs about 300 people and is responsible for areas of one million persons in Moscow.

Hospitals are required to send annual standardized reports to the local or regional centers. These reports indicate the number of disease cases (infectious diseases, including hospital infections, and noninfectious diseases, such as cardiovascular diseases). Reports are generated in the hospital laboratories. Data are summarized at the centers and forwarded to the federal government.

If any surveillance is being done in hospitals, it is managed by the head nurses; we were unable to ascertain that any systematic surveillance is being done. Nevertheless, we were informed that surgeons at the Vishnevsky Institute of Neurosurgery in Moscow are given feedback about surgical site infections in patients on whom they operated.

Environmental culturing is done frequently in order to detect contamination of equipment and surfaces. Monthly environmental cultures are not reported to the surveillance centers, but are used internally. The regional centers can initiate and take surveillance cultures when desired. In the United States, we have discouraged environmental culturing except in some very specific situations.

Solutions of chlorine are used widely for disinfection of syringes, needles, equipment and sanitation. Although one hospital discarded disposable needles, syringes and catheters after a single use, in another hospital, we saw glass syringes and needles in a clear liquid, apparently being disinfected for reuse, along with transfer forceps in a solution of some sort.

The two hospitals that we visited were clean, but the physical plants appeared old. Medical equipment is very scarce unless donated by hospitals or compa-

nies in other countries, including the United States. Money in the hospitals, of which 99 percent is supported by public funds, is used for professional salaries, food and medications for the patients. Patients wore their own bedclothes. Bathrooms were very limited at Municipal Hospital #2 in Novgorod with, for example, one shower and three toilets serving a 33-patient dermatology unit. There were sinks in some of the four-to-six-bed wards with bar soap and towels at the patients' bedside tables. We did not see any liquid soap dispensers or paper towels at any handwashing sinks.

Urinary drainage systems that are closed and connected to indwelling catheters are sometimes even in short supply in the burn intensive care unit at Children's Hospital #9 in Moscow. This hospital, built in 1960, has 1,000 beds (800 beds are currently utilized); it is supported by Project Hope and much of the modern equipment has been donated by American companies. Whenever equipment is unavailable, the personnel improvise in order to maintain good aseptic practice. Under the guidance of consultants flown in from the United States, 500 Russian nurses have been taught state-of-the-art burn therapy and some have been taught sophisticated techniques in central venous pressure measurement.

In the 90-bed burn unit at Children's Hospital #9, 35 percent of the infected burn wounds are caused by *Pseudomonas* sp. and 25 percent by *Staphylococcus* sp. Cultures of the burn wounds are done one to two times per week with gauze swabs placed in tubes; tissue biopsies are not done for culture and histologic examination as are sometimes done in the United States for quantitative analysis of the burn wound.

Universal precautions are undeveloped in the Russian Federation as is the concept of employee health. APIC delegates asked many questions about the use of barriers (gloves, masks, gowns, eye protection) and the answers were always that precautions are used with patients known to have a communicable disease, but not with all patients. Gloves, which we were told had been donated by Johnson & Johnson, are available to health care employees in the cities we visited, but employees do not understand the reasons for using gloves routinely when exposure to blood and body fluids is likely. Masks are heavy and difficult to breathe through, and employees resist their use as well.

Routine culturing is done on some patients, but we were not told which body sites are cultured, how often cultures were taken or whether culturing was reserved for those who were obviously infected. Health professionals recognize that personnel are sometimes carriers of pathogenic outbreak strains and thus personnel at one hospital are cultured twice per year to detect carriage of *Staphylococcus*. *Staphylococcus* accounts for 85 percent of all infections in the hospital. (It was unclear if this 85 percent represented both community-acquired and hospital-acquired infections.) Multiple resistance is observed in a variety of organisms, including *Pseudomonas* and *Escherichia* sp. They are seeing resistance to vancomycin and carbenicillin. We were told that of all of the *Staphylococcus aureus* isolates, methicillin-resistant *Staphylococcus aureus* (MRSA) represented three to five percent, which is considerably lower than that seen in some hospitals in the United States, where a proportion of MRSA as high as 50 percent is sometimes seen.

Surgeons seem to be highly specialized in operating at certain body sites; ie., surgery of the liver and pancreas, surgery of purulent wounds. Antibiotics are not ordered routinely for prophylaxis prior to surgical procedures. Nevertheless, all antibiotics are available in the marketplace if one has the money for them and pharmacies can sell them to anyone. Sensitivities are done routinely for 20–25 antibiotics, according to the spokesperson at the Vishnevsky Institute of Neurosurgery in Moscow.

We were able to garner much information from Russian health officials and professionals concerning some important communicable diseases and the mechanisms currently in place for detecting and controlling them. There is a lack of funding for immune globulins, certain vaccines, drugs such as rifampin, modern diagnostic equipment and acceptable barrier products such as gloves, masks and gowns.

Laboratory resources could be used more efficiently and systems of infection control need to be developed with in-depth planning and assessment. Without access to current scientific journals, infectious disease resource textbooks or computers, the average Russian physician or nurse is at a distinct disadvantage in staying abreast of recommendations developed by scientists around the world.

REFERENCES:

1. Hoeprich P D. Diphtheria, p. 374. In: Hoeprich P D, Jordan M C, and Ronald A R. (eds.). Infectious Diseases, Fifth Edition. Philadelphia, J. B. Lippincott, 1994.
2. Centers for Disease Control and Prevention. Morbidity & Mortality Weekly Report, Yearly Summary for 1990, 1991, 1992, 1993.

When asked what the most pressing needs are related to infection control, we were advised that educational opportunities and educational resources (books, journals, computers, software) are considered the top priorities. APIC is in the process of assessing how it can best assist with the development of infection control and epidemiology in the Russian Federation. If health professionals have books or journals that they are willing to donate, or if anyone knows of a person who is willing to help with translating scientific information into Russian, please call Caryl Collier at the Bureau of Communicable Disease Control at (314) 751-6115.

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Editorial Note:

The MMWR is an excellent source of facts about disease trends, epidemiologic reports and health recommendations. It is published by the Centers for Disease Control and Prevention on a weekly basis. We at the Department of Health utilize it as a reference frequently. It is an extremely useful reference and public health workers use it extensively.

Missouri EPIDEMIOLOGIST

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Tick-borne Disease Awareness

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Bureau of Veterinary Public Health

Ticks flourish when warm weather returns. Along with ticks come the diseases which they carry. In Missouri, that means the following tick-borne diseases: tularemia, Rocky Mountain spotted fever (RMSF), ehrlichiosis and borrelliosis or Lyme disease. When addressing the risk of contracting these diseases and their severity, certain scientific facts should be kept in perspective. A review of all of these factors will be presented.

Missouri with its natural climatic condition of heat and moisture is an ideal ecological setting for an abundance of tick species. These include the Lone Star tick (*Amblyomma americanum*), the primary vector of tularemia in Missouri; the American dog tick (*Dermacentor variabilis*), the primary vector of RMSF in Missouri; the brown dog tick (*Rhipicephalus sanguineus*), the vector of ehrlichiosis in dogs; and the deer or wood tick (*Ixodes scapularis*), the suspected vector of borrelliosis in Missouri. While the above ticks are scientifically thought to be the primary vectors of these diseases in Missouri, it does not mean that the Lone Star tick could not transmit RMSF or the American dog tick could not transmit tularemia. The primary tick vectors of ehrlichiosis and borrelliosis in humans in Missouri are not known. From a purely scientific perspective, if a specific species of tick has the anatomic physiological potential to transmit a disease, it could be assumed that it would be capable of transmitting another disease. Indeed, this could and does sporadically happen. It is possible to infect a specific tick and have that tick transmit the disease.

In nature, however, there are other variables in the specific organism—the ecology of the specific tick and the environment that either makes a specific tick species a good viable vector of a specific disease or does not. All of these factors are, unfortunately, not known. What is known is that the human is not the natural host of any tick. Any of the above ticks will bite man only as a matter of last resort or favorable opportunism. Since man is not the normal host, the *Amblyomma* and *Dermacentor* species must spend four to six hours acclimating on the human host prior to taking a blood meal and thus transmitting a disease. The *Ixodes* species must acclimate for 12 hours or more before it begins to feed and transmit disease. Of the millions of vector ticks that are out in nature, only a small percent of them at any point in time are likely to be infected or carrying the organism when a person is bitten. Most importantly in Missouri, ticks are normally only around for five to six months of the year. Despite the intricacies that are required for tick-borne diseases to occur, and the relative ease by which they can be prevented, tularemia normally affects 35–40 Missourians every year, RMSF normally 25–30 a year and ehrlichiosis normally 15 per year. The borrelliosis or Lyme disease picture is not clear in Missouri; a true reservoir of viable vectors has not been scientifically established. Although cases of Lyme-like disease occur and are reported, it is expected that once all facts are sorted out, the borrelliosis disease numbers will resemble those of the other tick-borne diseases in Missouri.

The Missouri Department of Health stresses the following information to assist its citizens from contracting tick-borne diseases:

Tick Facts

- Ticks are bloodsucking arachnids capable of transmitting serious and sometimes fatal illness.
- Late spring and summer are peak times for exposure to ticks.
- Ninety-four percent of cases of disease transmitted by ticks occur between April 1 and September 30.
- Most tick bites resolve uneventfully.
- Ticks transfer infection only after they have fed for several hours and are engorged.

(continued on page 2)

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Personal Protection

- Avoid known tick-infested areas
- Apply repellents such as diethyltoluamide (Deet) and dimethylphthalate to clothing and exposed parts of the body. (These repellents are active ingredients in many popular insect repellents. Read ingredient labels.)
- Wear clothing that interferes with tick attachment (boots, full length, and one-piece outer garments.)
- Avoid sitting on grass and logs where exposure to ticks increases.
- Every four to six hours, inspect entire body, including hairy parts, to detect and remove attached ticks.

Procedure for Tick Removal

- It is suggested that the mechanical removal technique described below be used for all tick removal.
- It is important to remove a tick from the host as soon as possible after it is discovered.
- Proper tick removal is as important in reducing the chance of infections as timely removal.
- Exercise the same precautions when removing ticks from animals as when removing ticks from humans.

Steps for Tick Removal

1. Disinfect the site prior to tick removal.
2. Grasp the tick close to the skin using a blunt, curved forceps or tweezers. If fingers are used, shield them with tissue, paper towels or rubber gloves.
3. Pull upward with steady, even pressure. DO NOT twist or jerk as this may cause mouthparts to break off in the skin.
4. Take care not to squeeze, crush or puncture the body of the tick as its fluids may contain infective agents.
5. After removing the tick, thoroughly disinfect the bite site and wash hands with soap and water.
6. Safely dispose of the tick by placing it in a container of alcohol or flushing it down the toilet.
7. DO NOT handle ticks with bare hands as infectious agents may enter via mucous membranes or breaks in the skin.

Environmental Prevention

- Keep weeds and grass cut in yards and recreational areas.
- Clear brush along paths.
- Remove ticks from dogs to minimize the tick population in areas near residences.

Tularemia

Introduction

Tularemia is a disease of man and animals caused by the bacteria *Francisella tularensis*. Tularemia is also called rabbit fever and deerfly fever. Tularemia is enzootic in animals throughout the continental United States and in most areas of the world between 30–71° north latitude. Missouri lies in one of the two recognized (tularemia) regions in the North American continent, based on biogeographic epidemiology. This region, called the Ozark Plateau, encompasses portions of Missouri, Arkansas, Oklahoma and Kansas.

Epidemiology

Since 1983, Missouri has had a total of 455 cases of tularemia reported, or an average of 38 cases per year. See Figure 1. The number of reported cases had increased with 51, 58, 45 and 44 cases occurring in 1983, 1987, 1988 and 1991, respectfully. Missouri led the nation in the total number of cases reported for those years. In 1981, 1984, 1985 and 1986, Missouri ranked number two in reported cases, behind either Arkansas or Oklahoma.

Most cases occur south of the Missouri River. Figure 2 shows the distribution of cases by county for the last ten years. The percent of people contracting the disease from exposure to ticks or rabbits is about equal. The disease occurs more in males, probably due to exposure, than females.

Reservoirs and Transmission

Ticks not only are the most important vectors of tularemia, but they also serve as reservoirs for the organism, which is transmitted transovarially. Seven tick varieties are known to transmit tularemia, either animal to man or animal to animal. Three of these varieties are found in Missouri, however, only one variety, *Amblyomma americanum* (Lone Star tick), is considered as a direct transmitter of tularemia to man. This tick is found primarily south of the Missouri River, and more specifically, is concentrated in the Ozark region as evidenced in Figure 2. All stages of this tick (larva, nymph and adult) readily feed on humans as well as livestock, dogs, deer and birds.

Dermacentor variabillis (American dog tick) and *Haemaphysalis leporispalustris* (rabbit tick) are other ticks found in Missouri which transmit tularemia in animals. The American dog tick prefers dogs; however, it readily feeds on other mammals, but is not considered a threat to humans. The rabbit tick prefers to feed on birds during its nymphal stage, while the adult tick prefers rabbits, dogs, cats or horses as hosts.

Rodents and rabbits are the most susceptible animal species for tularemia and serve as the major source of infection for man. The disease also has been reported in sheep, goats, swine, cattle and horses. The infection is transmitted by insects (ticks, deerflies, fleas) as well as by water and contaminated feed. Dogs and cats are susceptible and have been known to contract the disease by eating the raw meat of sick, wild rabbits. The disease can then be transmitted to man through bites or scratches. In addition, transmission via laboratory infections has also been reported.

Although the domestic rabbit is susceptible to experimental tularemia, rabbits raised in rabbitries and confinement in the United States have very rarely been found infected; therefore, they may be handled and eaten safely.

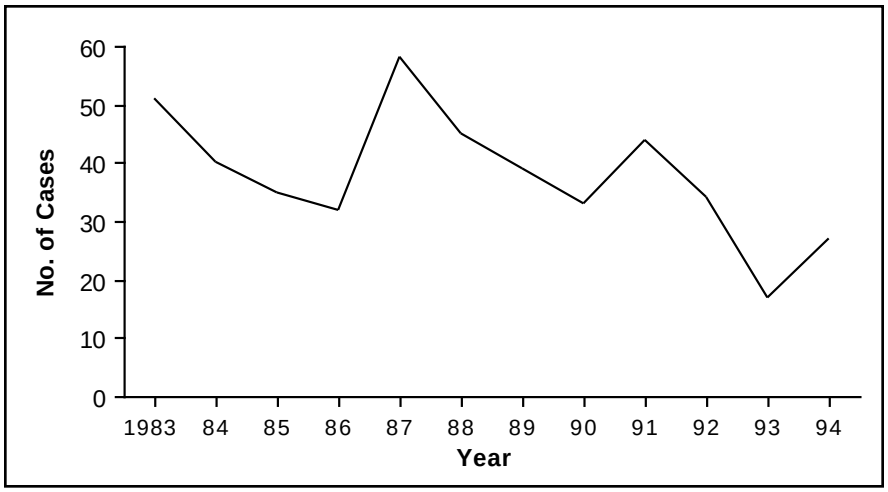

Figure 1. Tularemia cases by year of report, Missouri, 1983–94.

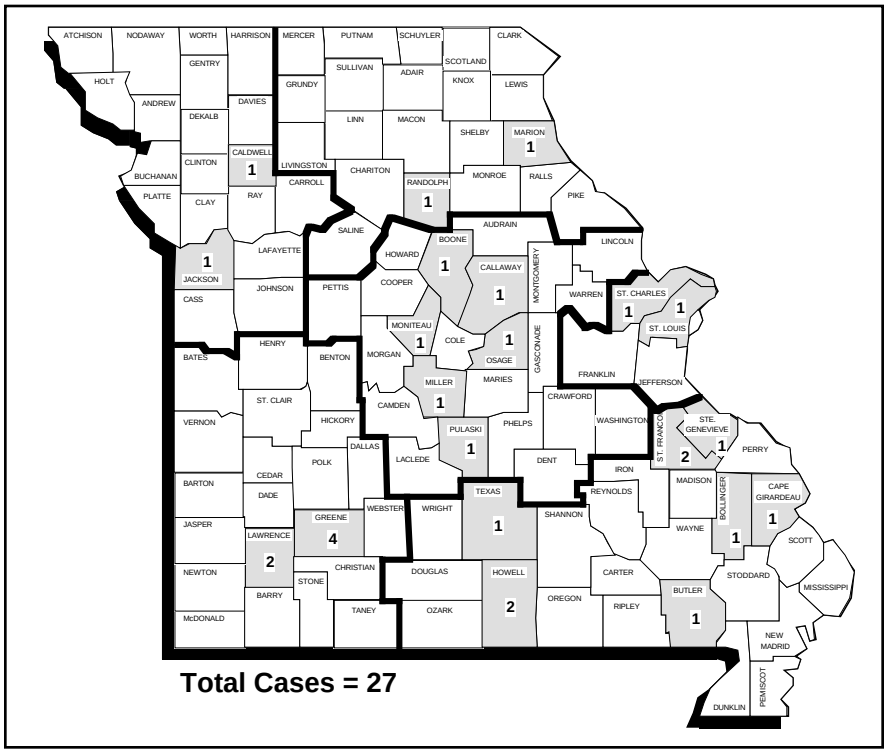

Figure 2. Tularemia cases by county, Missouri, 1994.

"White spotty" livers in wild rabbits as game may cause concern. Although white spots in the liver may be indicative of tularemia, it is not the only cause of such lesions. It should be stressed that once the carcass has been opened using bare hands, human exposure has occurred. Protective gloves should be worn while skinning and dressing wild game.

Diagnosis

The *Francisella tularensis* organism, a small, gram-negative bacterium, is extremely virulent in man. Onset of the disease is sudden with the incubation period being two to five days normally, with a range from one to ten days.

Patients with a history of recent tick exposure, dressing wild game animals or being in outdoor areas in summer months who present with fever, headache, malaise, prostration, ulcerated lesions or swollen lymph nodes could be prime candidates for tularemia, and it should be included in the differential diagnosis. Since insect bites are often unnoticed and the disease may be contracted by drinking contaminated water, inhaling infected dust or eating undercooked meat, tularemia should not be ruled out based on history alone.

Six forms of the disease are described: ulceroglandular, glandular, oculoglandular, oropharyngeal, typhoidal and pneumonic. The clinical forms of disease are determined by portal of entry of the organism.

Three Most Common Forms of Tularemia

The ulceroglandular form is the most common clinical form and accounts for 85 percent of the human cases reported in the United States. A local lesion occurs at the portal of entry (insect bite, scratch by contaminated nails or knife cut) and later develops into a necrotic ulcer accompanied by swelling of the regional lymph nodes. The lymph nodes frequently ulcerate and drain.

The oculoglandular form develops when contaminated material reaches the eye. The primary lesion is localized in the lower eyelid and consists of an ulcerated papule with simultaneous swelling of the regional lymph node.

The typhoidal form is believed to be caused by consuming contaminated foods, usually the meat of infected wild rabbits, or contaminated water. Symptoms include gastroenteritis, fever and toxemia. Ulcerative lesions in the mucosa of the mouth, pharynx and intestines, sometimes accompanied by swelling of the cervical, pharyngeal and mesenteric lymph glands, also appear. If not treated promptly, the course of this clinical form may be short and fatal.

(continued on page 4)

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It is estimated that 30 percent of all tularemia patients develop bronchopneumonia. The case fatality rate in the United States is less than one percent in treated cases and five percent in untreated cases.

The Department of Health State Public Health Laboratory no longer conducts agglutination tests specific for *Francisella tularensis.* Ideally, acute and convalescent sera should be tested to demonstrate a fourfold rise in titer which is diagnostic. Titers usually take 10–14 days to develop and reach their peak in four to six weeks. Titers may remain elevated for years. If only convalescent serum is tested, a titer of 1:160 with compatible symptoms is considered to be diagnostic. Culturing of the organisms is difficult because of its fastidious growth habits. It is usually cultured in a cystine agar. Recently it was found that a number of agars contained cystine, thus promoting growth of the *Francisella tularensis* organism while culturing for other organisms. This scenario caused the exposure of a number of laboratory workers not practicing microbiological safety requirements.

Treatment

Streptomycin sulfate remains the drug of choice; 15–20 mg/kg/day intramuscularly (IM) in divided doses, every 12 hours for 10 days of treatment should eradicate organisms. With streptomycin therapy, there is usually marked clinical improvement in 48–72 hours. Kanamycin sulfate (15 mg/kg/day IM) or gentamicin (3.0 mg/kg/day IM) are also effective. Tetracycline hydrochloride and chloramphenicol are effective in controlling the acute symptoms; however, unless treatment consists of 2.0 g daily for 15 days, relapses are common.

Control/Prevention

Man is primarily infected from handling, skinning and cleaning infected wildlife, from eating undercooked infected meat, drinking contaminated water and through insect bites. Critical at-risk groups include trappers, fur dealers, those working in fur-processing plants and hunters and their families. These simple precautions should be followed:

1. Avoid handling a wild rabbit that is too sick to run or that is caught by a dog.
2. Wear rubber gloves or thoroughly disinfect hands during or after dressing or skinning rabbits or aquatic fur animals.
3. Thoroughly cook wild game meat. The causative agent is destroyed within ten minutes at 140° Fahrenheit.
4. Avoid drinking untreated water.
5. Avoid bites of flies, mosquitoes and ticks through the use of insect repellents and protective clothing when working in endemic areas.

Rocky Mountain Spotted Fever

Introduction

Ninety percent of the thousand rickettsial diseases that occur annually in the United States are RMSF. During the 1980's, approximately 50 deaths per year in the United States were attributed to RMSF. The total number of cases nationally increased since the 1960's and peaked in 1981. While the national incidence, and especially the incidence in southeastern states plateaued or decreased, the incidence of RMSF in Arkansas, Oklahoma and Texas increased between 1981–83 by 107 percent. This was followed by a 50 percent decrease in those states in 1984–85. The majority of cases (83%) in those states occurred between April and August and 67 percent of the cases were males. The case fatality ratio was 4.7 percent, with rates being higher in blacks and elderly. The endemic foci of RMSF that exists in Arkansas, Oklahoma and Texas has an annual incidence trend that differs from the rest of the nation.

Epidemiology

Missouri does not totally follow either trend. See Figure 3. From 1982–85, Missouri averaged 12 cases per year. The four years prior, 1978–81, Missouri averaged 28.5 cases per year. The number of cases from 1986–88 increased yearly with 25, 26, and 54 cases occurring in those respective years. From 1989–93, the number of cases has decreased progressively from 48 cases in 1989 to 20 cases in 1993. There was a slight increase in 1994 with 29 cases reported. Missouri's highest number of cases occurred in 1988, seven years after the nation experienced its highest number of cases in 1981. This increased number of cases is due to the normal cycling of disease. Better diagnostic procedures and surveillance also play a role. Missouri had one death reported from RMSF in each of 1988, 1990, 1992 and 1994. Figure 4 shows the distribution of RMSF cases by county in Missouri in 1994.

There has also been an increased number of cases and deaths due to RMSF in dogs in recent years.

During 1981–83, there were 3,294 cases of RMSF reported to the Centers for Disease Control and Prevention. Of that number, 87 percent were followed up with a case investigation report. The number of final cases that met the RMSF case definition was 1,375, or 41.7 percent of the number initially reported. While this disparity may be confusing or discouraging to the reporting physician, it should be kept in mind that without the physician's early diagnosis and treatment, based on only minimal clinical evidence, the patient's disease would most likely have advanced to a truly confirmed case of RMSF, perhaps resulting in a fatality. This fact should be remembered in the diagnosis and treatment of all tick-borne diseases.

Reservoirs and Transmission

The infectious agent of RMSF is *Rickettsia rickettsii*. Even though dogs, rodents and other small animals may har-

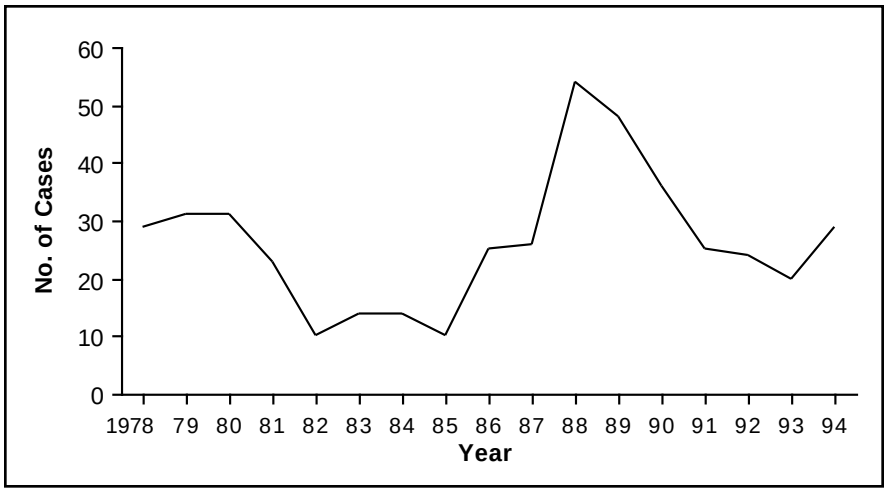

Figure 3. Rocky Mountain spotted fever cases by year of report, Missouri, 1978–94.

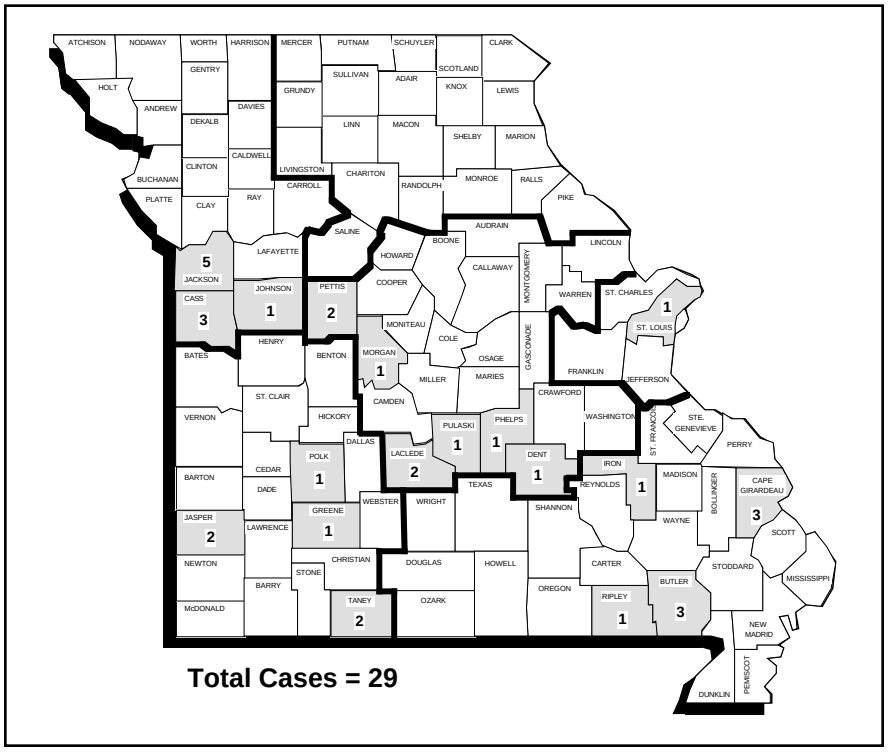

Figure 4. Rocky Mountain spotted fever cases by county, Missouri, 1994.

bor the rickettsiae, the principal vector and reservoir is the tick. Ticks may become infected by feeding on infected mammals (rodents, dogs and possibly other domestic animals) and harbor the rickettsia for life (about 18 months). Infected female ticks can transmit the disease transovarially to their offspring. Thus, animal reservoirs, while they may play a role in the maintenance of the disease cycle, are not necessary for the maintenance of the rickettsial organisms in nature.

Diagnosis

Rocky Mountain spotted fever (RMSF) is characterized by sudden onset of symptoms including headache, conjunctivitis, peripheral and periorbital edema, chills, fever lasting two to three weeks, myalgia and a maculopapular rash, usually appearing on the second to sixth day. The rash is the most characteristic and helpful diagnostic sign. It usually appears first on the wrists and ankles and may include the palms and soles, spreading centripetally to the rest of the body. If treatment is delayed, petechiae and purpuric skin lesions are common. Health professionals are encouraged to investigate the possibility of tick exposure when diagnosing illnesses in patients presenting with these symptoms.

RMSF is best confirmed by a fourfold rise in titer of antibody to the spotted fever group antigen by indirect fluorescent antibody (IFA), complement fixation (CF), microagglutination (MA), indirect hemagglutination (IHA) or the latex agglutination (LA); a single convalescent titer of 1:64 or higher (IFA) in a clinically compatible case; by isolation of a spotted fever group rickettsiae; or by fluorescent antibody staining of biopsy or autopsy specimens. The Weil-Felix (also known as Proteus OX-19, OX-2, WF) test, which is not specific to RMSF, will give false positive elevation with non-rickettsial infections and should not be used as a diagnostic test.

Treatment

The confirmation of RMSF is of epidemiologic importance and usually cannot be expected to occur before 10–14 days after onset of illness. Therefore, diagnosis must rely on clinical (fever, headache, rash, myalgia) and epidemiologic (tick exposure) criteria, and treatment must be initiated **before** laboratory confirmation is available. The treatment drugs of choice are tetracycline (25–50 mg/kg/day) and chloramphenicol (50 mg/kg/day) orally in four divided doses for 7–10 days.

Control/Prevention

Avoid unnecessary exposure to ticks. Follow instructions for proper removal of ticks given in this article on pages 1 and 2 of this issue.

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Ehrlichiosis

Introduction

The causative agent of human ehrlichiosis in the United States was isolated in 1985 from a patient at Fort Chaffee, Arkansas. The organism was named *Ehrlichia chaffeensis*. Since that time, 335 additional cases have been reported from 24 states, with nine fatalities. Previously, human cases (caused by *Ehrlichia canis* or a closely related organism) had been diagnosed in Japan and Malaysia. *E. canis* is a well-established cause of animal disease, particularly in dogs and horses.

Epidemiology

Missouri has reported the highest number of ehrlichiosis cases in the nation since 1988 with a total of 103 cases, or an average of 14.7 cases per year. See Figure 5. This represents a higher level than has been reported from any other state. Figure 6 shows the distribution of ehrlichiosis cases by county in Missouri in 1994.

Males are affected more than females, and the majority of patients were between 30–60 years of age (age range = 2–68). Patients were exposed to infection in 24 states, the majority of which are in the southeastern and south-central areas of the country. Onsets of illness occurred between March and October.

Reservoirs and Transmission

Ehrlichia, members of the family Rickettsiaceae, are obligate, intracellular bacteria that parasitize mononuclear or polymorphonuclear leukocytes. The ability of *Ehrlichia* to infect and cause disease in animals is well-documented. In the United States, serological evidence of *E. canis* infection has been reported among dogs in at least 34 states.

Preliminary data suggest that human ehrlichiosis, like canine ehrlichiosis, is tick-borne. Although canine ehrlichiosis is transmitted by the brown dog tick, *Rhipicephalus sanguineus*, this tick is probably not the main vector or reservoir involved in human transmission since it rarely bites people. Because transovarian transmission does not occur in this tick, foxes, coyotes, wolves, deer, rodents and chronically infected dogs should be considered possible reservoirs. There is no evidence that human ehrlichiosis is transmitted directly from dogs to people.

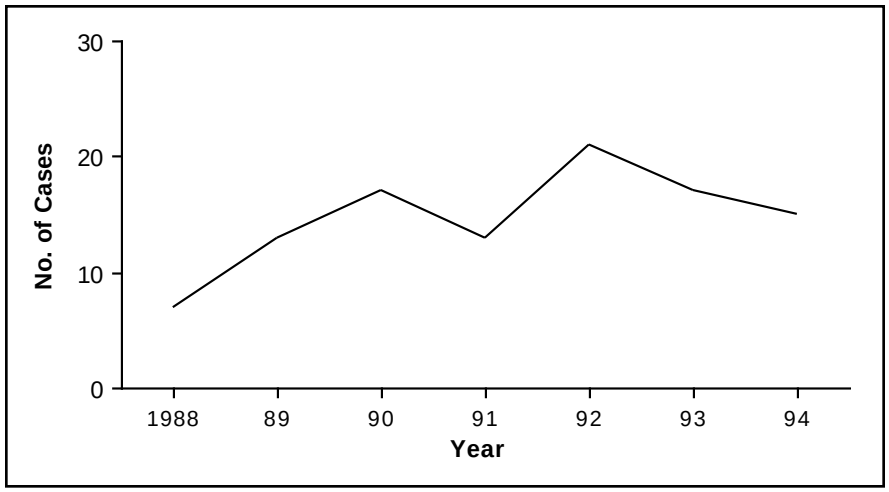

Figure 5. Ehrlichiosis cases by year of report, Missouri, 1988–94.

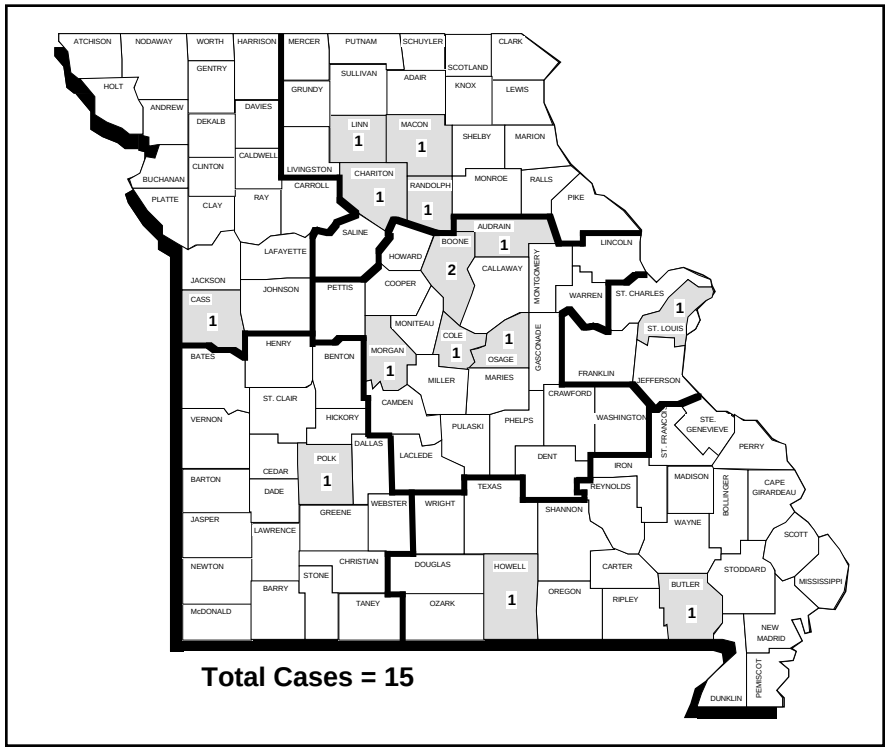

Figure 6. Ehrlichiosis cases by county, Missouri, 1994.

Diagnosis

Human ehrlichiosis resembles RMSF both clinically and epidemiologically.

- Eighty-three percent of the reported cases were suspected to have RMSF but developed no RMSF antibodies.
- Ehrlichiosis often presents with nonspecific symptoms similar to RMSF. Fever and headache are usually present, but rash is present in only 41 percent of

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Risk Communication in Environmental Health
What, Why and How

Gale M. Carlson
Bureau of Environmental Epidemiology

Risk communication is the provision of technical information to primarily non-technical audiences regarding the likelihood of a negative event happening. Examples related to environmental health include the risk of getting cancer or emphysema from tobacco use, the risk of getting lung cancer from exposure to radon, the risk of delaying or impeding mental development in children from exposure to lead, or the risk of developing illness from living near a hazardous waste site.

Risk communication should effectively warn people when there is a risk, and effectively calm people's fears when there is not a risk. Because any kind of effective communication should be two-way, all people involved in the risk communication process must be willing to listen as well as talk. In the past, government officials felt that simply providing people with the facts (as determined by the government) was sufficient risk communication. As citizens became aware that science and medicine were not static, wholly understood disciplines and that scientists, physicians and government employees were not always correct in their risk pronouncements, the public began to question both the accuracy of the risk messages and the reasoning and/or honesty of the messengers.

In order to bridge the gap between the providers of technical information and the non-technical, concerned and possibly affected public, a new process is being developed in which two-way communication is encouraged and public input is utilized in determining how risks are estimated and what form risk messages should take. In the past, studies to determine exposure of the public to hazardous wastes near their communities would have been designed and implemented by health and environmental agencies. Results would have been presented to the communities in the form of a press release and possibly a single large public meeting. Many times the risk would be quantified in technical jargon such as "$1x10^{-6}$ excess lifetime risk of developing cancer." Today the study design would include input from citizen advisory committees and local health officials. The data gathering portions of the study might include assistance from the local community's health and medical professionals. Comments on the results of the study would be sought from all interested parties, and communication of the results would include "public availability sessions" in which interested individuals could discuss any portion of the study with the authors in a personal interaction. Risks would be discussed in as non-technical a way as possible, geared to each person's level of concern and ability to assimilate complicated information. This beginning-to-end inclusion of the community does much to diffuse the antagonism usually evident when the government plans to impact the lives of its citizens.

Often risk communication messages are not well received because they are unpleasant or not satisfying. The Missouri Department of Health, Bureau of Environmental Epidemiology receives many citizen concerns about hazardous substances *a priori* linked to various health problems associated with suspected exposure to hazardous waste sites. People are trying to shift blame or understand causation when many times neither blame nor cause can be determined. They want to know, "Why do bad things happen to good people?" If it's explained that their health concerns are not linked to exposure to the site, as they suspect, they do not readily accept that message. Conversely, since many adverse health outcomes result from personal life-style choices (smoking, poor diet, risky behaviors), using risk communication to relay those messages is not well received either. To overcome resistance to risk communication messages, it is important that health personnel involve the public as soon as possible and attempt to understand all of their concerns, whether those are about the risk of exposure to hazardous substances or about issues such as trust, fairness or property values.

In the communication of risk, comparisons of various risks are used to illustrate how the risk in question ranks compared to other more common risks. This can be helpful, but must be done very carefully. It is never acceptable to compare a risk that is seen as unquantified, fear inducing and non-voluntary, like exposure to an illegal hazardous waste site, to something familiar, such as tobacco use. This type of comparison is perceived as an attempt to belittle a person's concerns and point a finger at their life-style choices. If a risk comparison is used, it should use exposures that are as similar as possible. An example is comparing adverse health risk from living near a proposed hazardous waste incinerator to the documented increase, or lack of increase, of adverse health effects from a similar incinerator in another location.

Risk communication must **not** become a forum to preach to people, but must remain a way to include, acknowledge and address all concerns expressed. Honesty, above all else, must be stressed to persons who communicate risk. If a risk is poorly understood, or if there is an unquantifiable risk, these facts must be made known. Public servants have no right to impose a value system on the general public. It's acceptable to discuss personal feelings about the risk if a person was exposed to it, or if it also affected one's family, but public servants must not trivialize others' concerns

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Legionellosis Associated with a Whirlpool Spa St. Charles County, Missouri, October 1994

Douglas R. Dodson
Eastern District Health Office

Paul Crede
State Public Health Laboratory

On October 3, 1994, the Missouri Department of Health (DOH) was notified by the St. Louis County Health Department, Communicable Disease Control Services section (STLCO/CDCS) of four hospitalized cases of culture-confirmed *Legionella pneumophila*, serogroup 01 (Lp-01). The cultures were obtained by bronchial lavage (three patients) or open lung biopsy (one patient). The four patients had been admitted to two hospitals during the period of September 16–25. Initial interviews with family members identified a common association with a country club in St. Charles County for three of the patients. No similar association could be determined for the fourth patient. An investigation by representatives of the STLCO/CDCS, the St. Charles County Health Department, Environmental Health Unit and the DOH was initiated and environmental samples were collected from the country club on October 13 and 17.

On October 21, preliminary results from the State Public Health Laboratory indicated that environmental samples collected from a whirlpool spa and filter were positive for Lp-01, and at that time the country club was advised to close and clean the whirlpool spa. Due to the age of the system, replacement filters were not immediately available and the management elected to shut down the system but not to clean it until new filters could be installed.

The isolates from the whirlpool spa and filter in the country club were subsequently identified by the Centers for Disease Control and Prevention (CDC) as Lp-01 monoclonal antibody subtype (1,2,5), the same subtype as the clinical isolates taken from the three country club-associated patients. The clinical isolate from the fourth patient was Lp-01 monoclonal antibody subtype (1,4,7).[1] Additional testing by CDC using arbitrary primer polymerase chain reaction (Ap-PCR) also matched the isolates from the whirlpool spa and filter with the clinical isolates of the three country club-associated cases (personal communication from Barry S. Fields, Ph.D., CDC).

On October 27, samples from the whirlpool spa and whirlpool spa filter were again collected. In the interim, the system had been shut down but no cleaning or disinfection had taken place. Air samples were also collected in the whirlpool spa room while the spa was operating and in the adjacent locker room. This procedure was requested by CDC because positive cultures from air samples had not been obtained in previous Lp-01 outbreaks in similar settings. All samples were negative for *Legionella* spp.

Recommendations:

The recommendations provided to prevent recurrence included thoroughly cleaning the system, periodically hyperchlorinating the system, maintenance of 3–5 ppm of residual chlorine levels in the spa at all times and frequently changing the filter cartridges.

Comments:

All three country club-associated case-patients had played golf at the country club during the period of September 11–13. Two of the case-patients were intubated in intensive care and could not be interviewed; one subsequently died. The third recovered sufficiently to be interviewed but denied using the whirlpool spa; however, he indicated that he had used the wash room located in the same general area as the whirlpool spa. The spouses of the other two case-patients were strongly convinced that their spouses had never used the spa, but had used the wash room after playing golf.

The whirlpool spa had been at this facility for eight years. The manufacturer of the spa had gone out of business, which made replacement filters difficult to obtain. The way in which the spa was constructed placed the filters, pumps and heaters about thirty feet away from the spa itself. Since air entered the thirty-foot pipes during cleaning, this made the spa very difficult to prime and restart after cleaning. Management indicated that cleaning procedures were carried out at varying intervals depending on usage. The individual who normally maintained this system was on vacation during the suspected period of exposure.

Acknowledgments: P. Sommerhalder, RN, St. Louis County Health Department-Communicable Disease Control Services; M. Skala, MA, Missouri Department of Health-Division of Environmental Health and Epidemiology; D. Hagner, State Public Health Laboratory; D. Sterling, PhD, CIH, St. Louis University School of Public Health and A. Holt, St. Charles County Health Department-Environmental Health Unit.

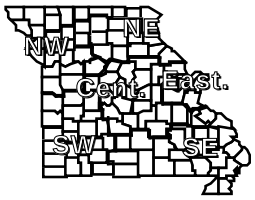
REFERENCE

1. Joly JR, McKinney RM, Tobin JO, Bibb WF, Watkins ID, Ramsay D. Development of a standardized subgrouping scheme for Legionella pneumophila serogroup 1 using monoclonal antibodies. J Clin Microbiol 1986;23:768–71.

Vaccine Handling/Storage Quiz:
How would you "handle" this situation?

It's Friday afternoon and the shipment of OPV vaccine that you have been waiting for has just been delivered to your clinic. You open the box only to find there is no dry ice in the package. What should you do?

Answer may be found on page 11



Missouri Department of Health
Division of Environmental Health and Epidemiology
BIMONTHLY MORBIDITY REPORT

Reporting Period *
November - December, 1994

	Districts							KANSAS CITY	ST. LOUIS CITY	ST. LOUIS CO.	SPGFLD GREENE CO.	2 MONTH STATE TOTALS		CUMULATIVE		
	** NW	NE	CD	SE	** SW	** ED	*** OTHER					1994	1993	FOR 1994	FOR 1993	5 YR MEDIAN
Vaccine Preventable Dis.																
Chickenpox	352	162	157	450	286	110		0	0	0	2	1519	1661	10147	9609	9609
Diphtheria	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Hib Meningitis	0	0	1	1	1	0		0	0	0	0	3	3	7	12	43
Hib Other Invasive	0	0	0	1	0	0		3	1	1	0	6	26	44	123	**
Influenza	0	0	0	0	0	0		0	0	0	0	0	25	163	272	272
Measles	0	0	1	0	0	0		0	0	0	0	1	0	161	1	1
Mumps	1	0	2	1	0	1		0	1	0	0	6	9	44	46	46
Pertussis	0	0	1	1	0	0		2	0	0	2	6	19	45	144	120
Polio	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Rubella	0	0	0	0	0	0		0	0	0	0	0	0	2	1	3
Tetanus	0	0	0	0	0	0		0	0	0	0	0	1	1	1	1
Viral Hepatitis																
A	3	0	8	4	4	10		7	26	31	3	96	148	619	1443	810
B	8	4	3	1	13	4		7	65	3	12	120	84	538	585	585
Non A - Non B	5	0	0	0	0	1		0	1	6	0	13	2	32	25	31
Unspecified	1	0	0	0	0	0		0	0	0	0	1	2	1	19	15
Meningitis																
Aseptic	4	2	4	2	3	4		0	0	4	3	26	39	175	275	272
Meningococcal	1	0	0	0	0	0		0	0	2	0	3	3	43	34	32
Other	0	0	1	0	0	0		1	1	1	0	4	18	52	78	64
Enteric Infections																
Campylobacter	2	1	17	8	12	8		4	2	19	8	81	84	631	616	602
Salmonella	13	3	21	12	14	10		8	15	10	0	106	117	642	529	617
Shigella	42	64	71	3	9	3		20	15	18	8	253	101	654	674	411
Typhoid Fever	0	0	0	0	0	0		0	0	0	0	0	0	1	2	2
Parasitic Infections																
Amebiasis	0	0	1	3	0	0		0	2	1	1	8	10	38	54	25
Giardiasis	34	4	18	7	13	11		6	39	21	12	165	178	774	770	790
Sexually Transmitted Dis.																
AIDS	8	0	5	2	10	5	0	20	25	16	6	97	122	729	1649	655
Gonorrhea	49	36	87	77	46	13		415	1090	417		2230	1989	12555	13147	17488
Genital Herpes	20	18	55	36	41	22		91	131	138		552	595	3480	3729	3310
Nongonoc. urethritis	16	12	22	26	6	8		262	576	32	3	963	1042	6062	6425	6880
Prim. & Sec. syphilis	0	0	1	2	0	3		9	89	45	1	150	188	987	1354	572
Tuberculosis																
Extrapulmonary	3	1	1	0	0	0	0	0	3	1	0	9	9	44	45	45
Pulmonary	2	2	5	5	6	1	2	6	6	6	3	44	31	216	211	211
Zoonotic																
Animal Bites	139	27	49	125	84	98		0	4	343	21	890	698	6831	6503	6503
Psittacosis	0	0	0	0	0	0		0	0	0	0	0	0	4	1	1
Rabies (Animal)	0	0	2	4	1	0		0	0	0	0	7	5	27	35	35
Rocky Mtn. Sp. Fever	2	0	2	0	1	0		1	0	0	0	6	1	22	20	25
Tularemia	0	0	0	1	1	0		0	0	0	0	2	1	24	17	34

Low Frequency Diseases

Anthrax
Botulism
Brucellosis
Chancroid
Cholera
Cryptosporidiosis
Encephalitis (infectious) - 1
Encephalitis (viral/arbo-viral)
Granuloma Inguinale
Kawasaki Disease
Legionellosis - 10
Leptospirosis
Lymphogranuloma Venereum
Malaria - 2
Meningococcal, Other - 7
Plague
Rabies (human)
Reye Syndrome
Rheumatic fever, acute
Toxic Shock Syndrome
Trichinosis

Outbreaks

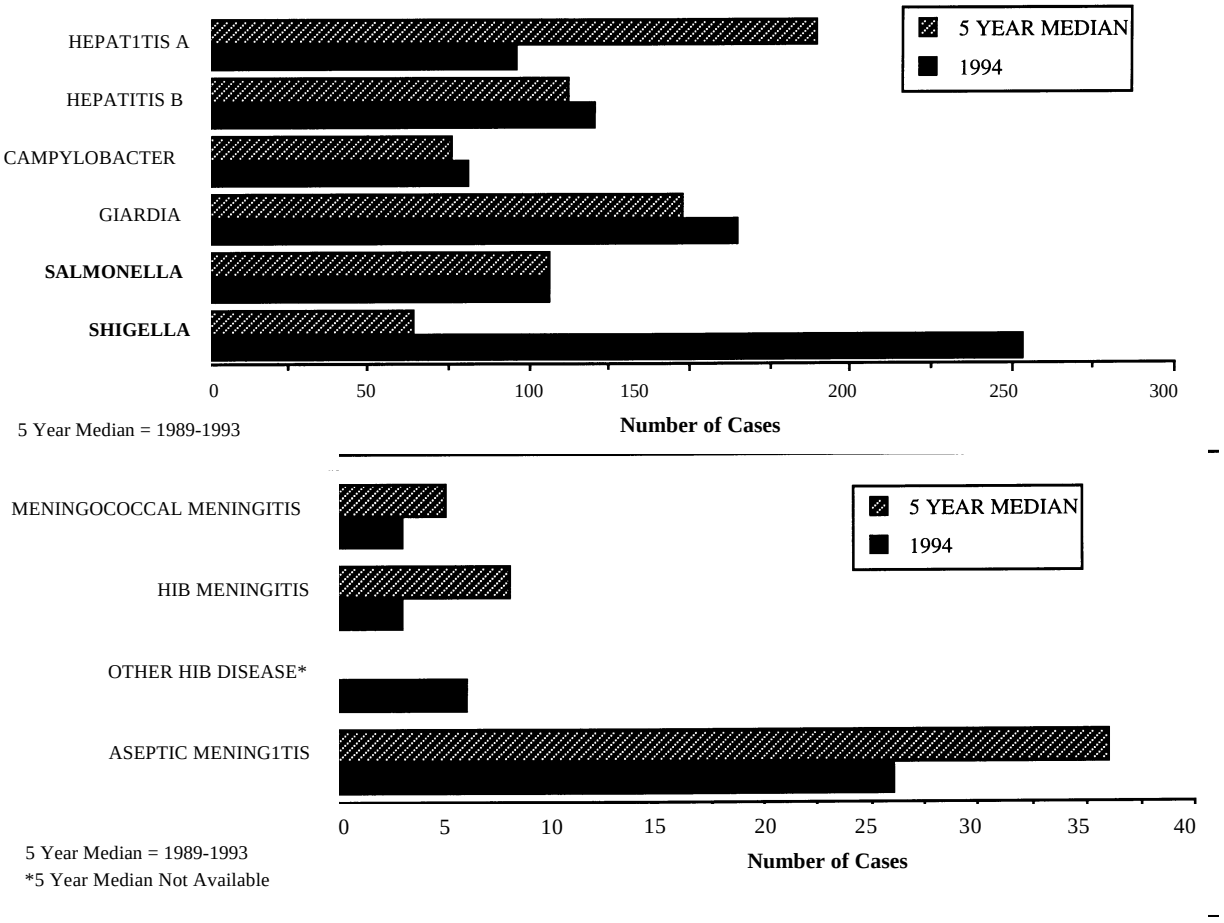
Foodborne - 6
Waterborne - 1
Nosocomial - 2
Pediculosis - 2
Scabies
Other
AGI - 1
Shigella - 5

*Reporting Period Beginning October 30, Ending December 31, 1994.
**Totals do not include KC, SLC, SLCo, or Springfield
***State and Federal Institutions
** Data not available

Due to data editing, totals may change.

TEAR OUT FOR FUTURE REFERENCE

DISEASE REPORTS. NOVEMBER/DECEMBER 1994 AND 5 YEAR MEDIAN



VIRAL HEPATITIS

During the November/December bimonthly period, the number of hepatitis A cases fell by 35.1%, from 148 cases during November/December 1993 to 96 cases during November/December 1994. This is 42.9% below the five year bimonthly median of 189 cases. Hepatitis B cases increased for the period and rose 42.9%, from 84 in 1993 to 120 in 1994. Hepatitis B is 7.1% above the five year median of 112 cases.

ENTERICS

There is little change in Campylobacter from 1993 to 1994. It decreased by 3.6%, from 84 cases in 1993 to 81 during the 1994 bimonthly penod. It increased 6.6% above the five year median of 76 cases. Salmonella, at 106 cases, has fallen 9.4% from 117 cases in 1993;106 is also the five year median. Shigellosis increased dramatically by 150.5% from 101 cases to 253 cases during the period. It is up 295.3% from the five year median of 64 cases.

PARASITES

There were 165 giardiasis cases reported in 1994, 7.3% less than the 178 cases reported in the 1993 period. This is 11.5% 11.5% above the five year median of 148
cases.

MENINGITIS Aseptic meningitis decreased by 33.3% to 26 cases in 1994 from 39 cases in 1993. Thisis a decrease of 27.7% from the five year median of 36 cases. At 3 cases, meningococcal meningitis showed no change from the 1993 to 1994 time periods. It decreased 40.0% from the five year median of 5 cases.

HIB DISEASE Hib meningitis was reported at 3 cases for the period in 1994 and 1993. This is a decrease of 62.5% from the five year median of 8 cases. Other invasive Hib disease decreased by 76.9%, from 26 cases in 1993 to 6 cases in 1994. There is no bimonthly five year median for other invasive Hib disease.

Vaccine Handling/Storage

Quiz Answer: (from page 8)

Step #1

With any shipment of vaccine, your first step is to check the condition of the vaccine. Record the temperature of the vaccine, check its condition and confirm that what is in the box is what you ordered. Once you have done that, the vaccine needs to be put in the refrigerator (yes, the fridge) while you figure out the next step.

Step #2

It's always a good idea to call the manufacturer, if this is privately purchased vaccine, or your local health department, if this is publicly provided vaccine, **immediately** when you encounter a problem with the condition of the vaccine shipment. In this case, it did not appear to be packed with dry ice. The shipper needs to know this in order to investigate the problem and prevent it from happening again. This problem can arise because dry ice was inadvertently omitted from the shipment, not enough dry ice was put in, or the box was kept at unusually high temperatures during shipment. For your decision making, you need to find out when the box was shipped.

Key Information: Read the Package Insert

OPV should be kept frozen, but can go through a certain number of freeze-thaw cycles provided that temperatures have not exceeded 46˚F (8˚C) and the vaccine has not been thawed a cumulative total of more than 24 hours.

Keep in the Refrigerator or Move to the Freezer?

When you examined the condition of the vaccine, you should have noted whether the vaccine was still in a frozen or in a liquid state. If it is still frozen (and the temperature of the vaccine package is 46˚F or less), you are in good shape. Put the vaccine in the freezer and use it as planned.

If the vaccine appears to have thawed partially or completely, you have two questions to answer. What was the temperature of the package when you measured it in step #1 and what is the maximum length of time the vaccine might have been in this state?

If the vaccine was sent **less than** 24 hours ago, and is at a temperature of 46˚F or less, consider the vaccine to have gone through one freeze-thaw cycle and transfer it to the freezer. Remember that OPV vaccine cannot be thawed longer than a cumulative total of 24 hours, so you will have to estimate thaw time for this shipment and not allow future thaws to exceed the vaccine's 24 hour limit. You may wish to mark the package in such a way that this is clear to persons administering the vaccine.

If the vaccine was sent **more than** 24 hours ago, and is at a temperature of 46˚F or less, you need to assume that the vaccine has been thawed for more than 24 hours. It can still be used! Keep it in the refrigerator at 36–46˚F (2–8˚C) and use it within 30 days. If you have more vaccine than you can use in 30 days and you received your vaccine from your local health department, you should notify them so they can arrange redistribution to other areas that can use it.

If the vaccine's temperature is greater than 46˚F, the vaccine cannot be used. If it was acquired through the local health department, arrange with them to return the vaccine for replacement. Be sure to inquire how the vaccine should be shipped. Similarly, discuss replacement with the manufacturer if the vaccine was acquired through other means.

Why not put the Vaccine in the Freezer While you Decide What to do?

Lederle Laboratories informs us that the vaccine becomes unstable if refrozen after it has been thawed more than 24 hours. Because you did not know cumulative thaw time, it is best to start in the refrigerator because you can maintain the vaccine safely thawed in that temperature range.

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Questions or concerns regarding vaccine handling or storage may be directed to your district immunization representative located in each of the district health offices or the Bureau of Immunization at (314) 751-6133.

Risk Communication

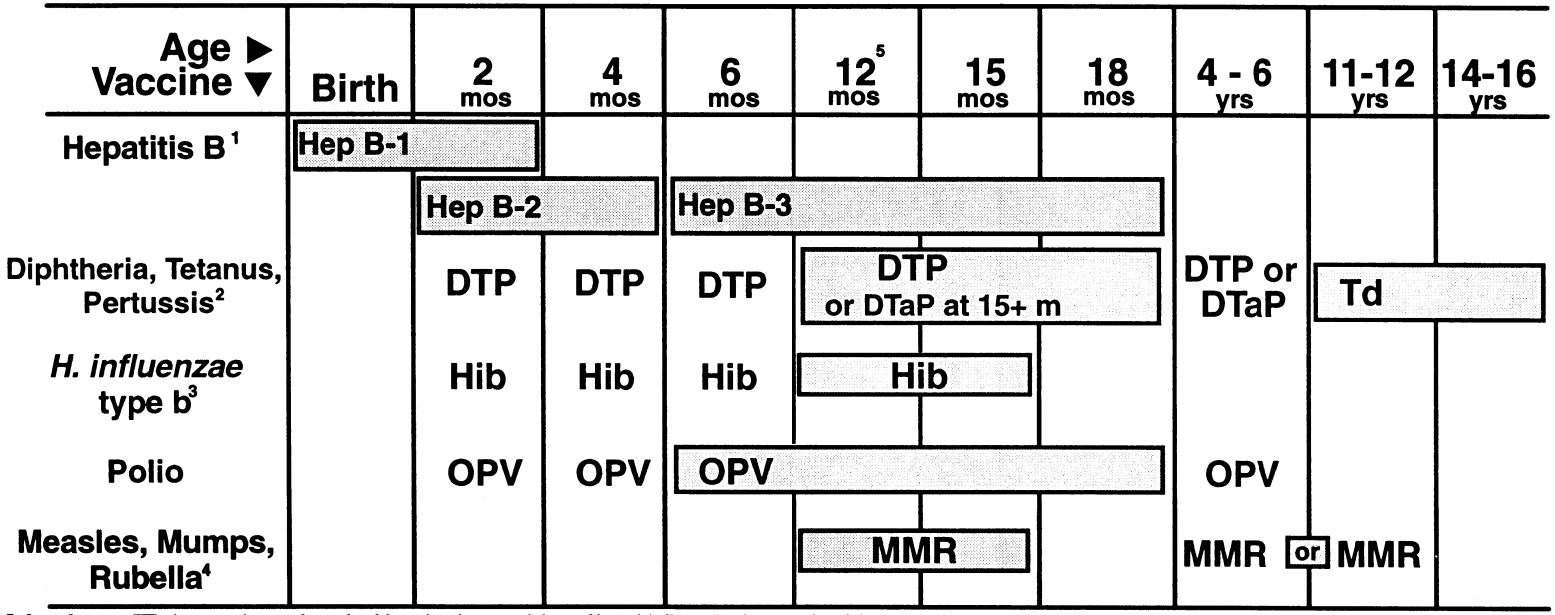
(continued from page 7)

whether those concerns are derived from logical analysis of the known factors or not. The public servant's job is to explain what they know as best they can, and acknowledge what is unknown openly so the public can make their own informed decisions.

Final note: When discussing risk, many topics come up that are not directly associated with the Department of Health's typical communication message, such as thoughts or concerns the risk communication is not prepared to deal with. These should not be passed over, but should be referred for discussion to other professionals who are better able to address that concern. This should happen as quickly as possible, hopefully in the same meeting or conversation. If that isn't possible, a qualified professional should have the resource person that can best address the concern contact the citizen. This is true customer service, which is an appropriate response from a public servant.

Recommended Childhood Immunization Schedule
United States - January 1995

Vaccines are listed under the routinely recommended ages. Shaded bars indicate range of acceptable ages for vaccination.



[1] **Infants born to HBsAg-negative mothers** should receive the second dose of hepatitis B vaccine between 1 and 4 months of age, provided at least one month has elapsed since receipt of the first dose. The third dose is recommended between 6 and 18 months of age.

Infants born to HBsAg-positive mothers should receive immunoprophylaxis for hepatitis B with 0.5 ml Hepatitis B Immune Globulin (HBIG) within 12 hours of birth, and the appropriate dose of hepatitis B vaccine at a separate site (Hepatitis B vaccine doses vary according to manufacturer and mother's HBsAg status, and package insert should be consulted for information on doses). In these infants, the second dose of vaccine is recommended at 1 month of age and the third dose at 6 months of age. All pregnant women should be screened for HBsAg in an early prenatal visit.

[2] The fourth dose of DTP may be administered as early as 12 months of age, provided at least 6 months have elapsed since DTP3. Combined DTP-Hib products may be used when these two vaccines are to be administered simultaneously. DTaP (diphtheria and tetanus toxoids and acellular pertussis vaccine) is licensed for use for the 4th and/or 5th dose of DTP vaccine in children 15 months of age or older and may be preferred for these doses in children in this age group.

[3] Three *H. influenzae* type b conjugate vaccines are available for use in infants: HbOC [HibTITER] (Lederle Praxis); PRP-T [ActHIB; OmniHIB] (Pasteur Mérieux, distributed by SmithKline Beecham; Connaught); and PRP-OMP [PedvaxHIB] (Merck Sharp & Dohme). Children who have received PRP-OMP at 2 and 4 months of age do not require a dose at 6 months of age. After the primary infant Hib conjugate vaccine series is completed, any licensed Hib conjugate vaccine may be used as a booster dose at age 12-15 months.

[4] The second dose of MMR vaccine should be administered EITHER at 4-6 years of age OR at 11-12 years of age.

[5] Vaccines recommended in the second year of life (12-15 months of age) may be given at either one or two visits.

Approved by the Advisory Committee on Immunization Practices (ACIP), the American Academy of Pediatrics (AAP), and the American Academy of Family Physicians (AAFP)

ACIP/AAP Revised and Harmonized Immunization Schedule

Anita R. Vonderahe
Bureau of Immunization

The two organizations that have traditionally provided childhood immunization schedules, the Advisory Committee on Immunization Practices (ACIP) of the U.S. Public Health Service and the Committee on Infectious Diseases of the American Academy of Pediatrics (AAP), have collaborated to develop a harmonized immunization schedule that accommodates both group's recommendations. For years, the ACIP provided a routine childhood immunization schedule used primarily in the public sector, while the AAP recommended a schedule used by many private providers. However, these two widely used schedules contained minor differences, and the potential existed for further discrepancies as more vaccines became available. Furthermore, greater collaboration between the private and public medical communities to increase childhood immunizations in the United States underscored the need for a single, unified childhood immunization schedule. The revised schedule, "Recommended Childhood Immunization Schedule—United States," became effective in January 1995. See revised schedule on page 12.

The purpose of the revised schedule is to promote increased immunization rates by allowing vaccines to be administered as early as possible, while providing some flexibility in scheduling immunizations. Differences resolved in the unified schedule include the timing of the third dose of OPV, the second dose of MMR and the schedule for infant hepatitis B vaccination.

Specific changes to the harmonized schedule allow for three doses each of diphtheria, tetanus and pertussis (DPT) vaccine, oral polio (OPV) vaccine, and *Haemophilus influenza* type b (Hib) vaccine in the first year of life. These vaccines are recommended at 2, 4, and 6 months of age, but the third dose of OPV may be given through 18 months of age.

For hepatitis B vaccine, the first dose is recommended at birth, but may be given up to 2 months of age. The second dose is recommended at 2 months of age, but 1–4 months is acceptable, as long as at least one month has elapsed since the first dose. The third dose may be given at 6–18 months of age.

Vaccines recommended at 12–15 months can be administered during one or two separate visits. However, giving all needed immunizations during one visit may help overcome the possibility of missed opportunities to vaccinate.

The second dose of measles, mumps and rubella (MMR) vaccine may be given at either 4–6 years or at 11–12 years of age, but Missouri law requires a second measles vaccination prior to school entry.

Tetanus and diphtheria (Td) vaccine is now recommended at 11–12 years of age, but may be given through 14–16 years of age. A booster injection is recommended every ten years throughout life.

The Department of Health endorses these schedule changes and encourages their routine implementation.

Questions or concerns regarding the revised immunization schedule may be directed to your district immunization representative located in each of the district health offices or the Bureau of Immunization at (314) 751-6133.

NOTE: Vaccines for hepatitis A and varicella (chickenpox) have recently been licensed by the Food and Drug Administration (FDA). Both the ACIP and AAP have endorsed the use of these vaccines, but have not yet released specific recommendations for their use. The ACIP is scheduled to meet in June, and it is expected that recommendations relating to these vaccines will be developed at that time.

Confirmation of Unusual Antibiotic Resistant Patterns in Bacteria

The Centers for Disease Control and Prevention (CDC) in Atlanta, Georgia, is interested in receiving isolates that have been previously identified by hospitals or private laboratories as resistant to certain key antimicrobial agents. Of special interest are *Staphylococcus aureus* or *Staphylococcus epidermidis* isolates resistant to vancomycin (MICs of ≥8 μg/ml), isolates of *Streptococcus pneumoniae* resistant to cefotaxime or ceftriaxone (MICs ≥2 μg/ml), *Klebsiella pneumoniae* isolates resistant to cefotaxime, ceftriaxone, ceftazidime or aztreonam (MICs ≥8 μg/ml), and any *Enterobacteriaceae* (*E. coli*, *Klebsiella*, *Citrobacter*, etc.) resistant to imipenem (MICs ≥8 μg/ml).

Isolates can be sent to the Missouri State Public Health Laboratory for processing and mailing to CDC, or isolates can be sent directly to CDC if the laboratory has the paperwork needed by CDC (DASH form). If a laboratory sends isolates directly to CDC, it will only be necessary to obtain laboratory log numbers for each isolate by calling the State Public Health Laboratory. CDC will confirm the antimicrobial resistance profile and return a report to the laboratory through the State Public Health Laboratory.

If you have questions or need to obtain a laboratory log number, please call:

Sandra Hanauer or
Beverley Payne
State Public Health Laboratory
P.O. Box 570
307 West McCarty Street
Jefferson City, MO 65102-0570
Ph: (314) 751-3334

Surveillance of Heat-Related Illness in Missouri 1985–94

Diane C. Rackers
Office of Epidemiology

Hyperthermia became reportable by law in Missouri effective April 8, 1993. Hyperthermia is defined as a physician-diagnosed case of heat exhaustion or heat stroke. Heat exhaustion means a reaction to excessive heat marked by prostration, weakness and collapse resulting from dehydration. Heat stroke means a severe illness caused by exposure to excessively high temperatures and characterized by severe headache; high fever with a dry, hot skin; tachycardia; and in serious cases, collapse, coma or death.

During the past ten summers, 153 Missourians have died of heat-related causes. The highest number of deaths occurred in the summers of 1987 and 1988 when 28 and 44 deaths occurred respectively. See Figure 1. The majority of heat-related deaths in Missouri occurred in St. Louis City. Of the total number of heat-related deaths, 62 percent occurred in persons age 65 or older. See Table 1. The rate of mortality increased sharply at older ages as seen in Figure 2. This emphasizes the need to be very supportive of the elderly when temperatures are unusually hot.

Table 1. Heat-related deaths and rates per 100,000 population by age group, Missouri, 1985–94.

Age Group	Frequency	Rate
0–4	2	.53
5–14	1	.13
15–24	3	.41
25–34	7	.82
35–44	8	1.09
45–54	12	2.30
55–64	24	5.24
65–74	33	8.39
75–84	34	14.03
85+	28	35.00
Unknown	1	
Total	**153**	

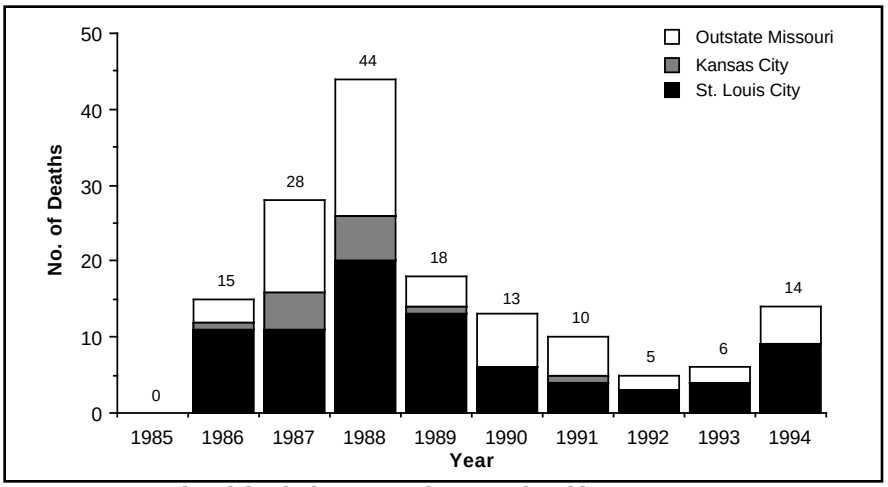


Figure 1. Heat-related deaths by year and geographical location, Missouri, 1985–94.

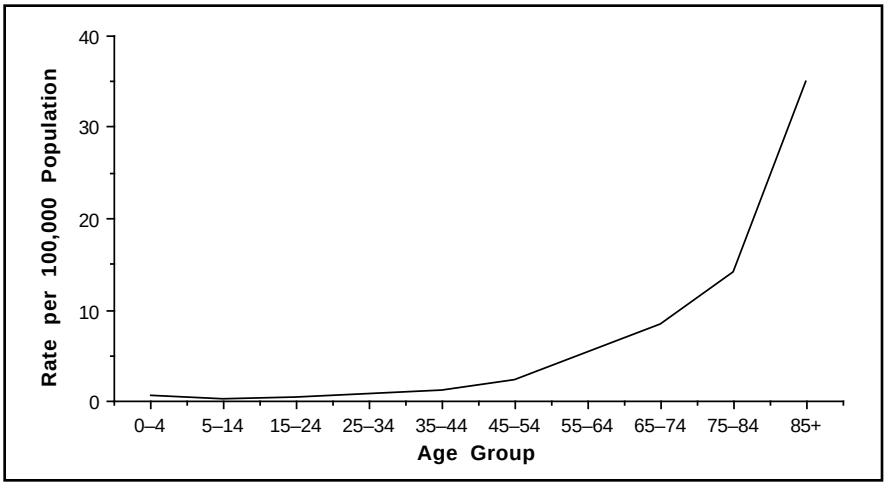


Figure 2. Heat-related death rates per 100,000 population by age group, Missouri, 1985–94.

1994 Heat Surveillance Summary

The summer of 1994 in Missouri started with gradually warming temperatures until mid-June when heat indices approached 100˚ across the state. The Department of Health issued its annual news release urging awareness of heat-related illnesses on June 13. On June 19, heat indices reached 108˚ in St. Louis, 101˚ in Kansas City, 108˚ in Columbia, 102˚ in Springfield and 109˚ in Cape Girardeau. This prompted the Department of Health to issue a statewide heat alert on June 20. Heat indices did not remain as high as predicted and the statewide heat alert was canceled on June 24. Temperatures remained relatively comfortable for the remainder of the summer except for a one-day peak on July 19, when heat indices reached 107˚ in St. Louis, 103˚ in Kansas City, 107˚ in Columbia, 103˚ in Springfield and 106˚ in Cape Girardeau. A forecast of extremely hot and humid conditions across the state for the Fourth of July weekend led the Department of Health to issue a news release on July 1 advising Missourians to take precautions to keep cool over the holiday weekend. Heat indices on July 4 reached 108˚ in St. Louis, 103˚ in Kansas City, 104˚ in Columbia, 102˚ in Springfield and 101˚ in Cape Girardeau.

(continued on page 16)

Department of Health Heat Surveillance for 1995

The Missouri Department of Health, in cooperation with local health departments, has conducted some form of heat surveillance since the great heat wave of 1980 when 295 Missourians died due to heat-related causes. Through public health education and news releases alerting Missourians to the possibility of heat-related illness, risk factors and prevention recommendations, the department hopes to continue to increase the public consciousness regarding this environmental stress in 1995. Heat indices from five areas of Missouri will continue to be monitored on a daily basis during the summer months and the following heat crisis procedures implemented as appropriate:

When a Heat Index of 105° is first reached (or predicted), the Department of Health or local health agencies will issue a **Heat Warning** urging personal caution as well as concern for others at high risk. In addition, monitoring of temperatures will be intensified. The Heat Index is determined by measuring temperature and humidity. Also known as *apparent temperature*, the Heat Index measures what hot weather "feels like." See heat index chart on page 17. For example, a Heat Index of 105° is reached when the temperature is 95°F and the relative humidity is 50 percent, or when the temperature is 90°F and the relative humidity is 67 percent.

A **Heat Alert** will be announced when:

1. The afternoon Heat Index has been at least 105° for two days and
2. When weather forecasts call for continued high-stress conditions for at least 48 hours over a large proportion of the state.

During a **Heat Alert**, the Department of Health will encourage local health departments to arrange for cooling shelters, and it will also encourage other community agencies to provide relief from the heat stress.

The Department of Health will recommend to the Governor that a statewide **Heat Emergency** be declared when:

1. Extensive areas of the state are experiencing high and sustained levels of heat stress (determined when the Heat Index reaches 105° for three days); and
2. Increased levels of heat-related illnesses or deaths are found in these areas; and
3. The National Weather Service predicts that hot and humid conditions are likely to continue for several days.

The **Heat Emergency** designation will be canceled when the Heat Index falls below 105° for 48 hours and the National Weather Service predicts a low probability that severe conditions will return within 48 to 72 hours.

Prevention of Heat-Related Illness

Although the elderly are at high risk for heat-related illness, others at high risk include the very young and persons who overexert themselves in hot environments either at work or during recreational activities. However, given sufficient heat exposure, anyone can develop fatal heat stroke.

Infants and very young children are particularly susceptible to heat exhaustion or heat stroke because they may not be able to obtain adequate fluids or avoid hot environments without assistance.

The elderly may also be immobilized because of illness or other injury. In addition, certain drugs taken most often by the elderly increase the risk for heat-related illness. These drugs include antipsychotics, major tranquilizers, antihistamines, over-the-counter sleeping pills, antidepressants and some antiparkinsonian agents.

Also at high risk are unacclimatized adults who work or exercise vigorously outdoors and fail to rest frequently in a cool environment or to drink enough fluids. In addition, excessive alcohol consumption causes dehydration and may dispose people to heat-related illness. Patients who are mentally or chronically ill, those who are acutely ill with febrile illness or diarrhea, and those who are confined to bed or otherwise unable to take care of themselves are more susceptible to heat-related illness. Other risk factors include a prior history of heat stroke, obesity and hyperthyroidism.

There are numerous environmental and personal risk factors involved in heat-related illness. The heat index reflects the joint impact of temperature and humidity on the body. The index is calculated for only a few locations across the state. Specific local factors, both outside of buildings and within, modify the impact for any given person. Cloud cover, shade trees, wind, asphalt and concrete, insulation, air conditioning, ventilation and use of fans affect the heat stress for an individual. Daytime fluctuation of temperature and the extent of nighttime cooling, modify the heat stress. The duration of exposure, including hours per day and number of successive days of exposure, also modify the stress.

Heat stroke is a life-threatening illness that occurs when the outside temperature adds heat to the body faster than the body can deal with it, so that the internal body temperature rises to the level of high fever. Heat stroke, which may develop within minutes or hours, is an emergency condition and requires immediate treatment to prevent death. Treatment includes rapidly lowering the

(continued on page 16)

(continued from page 15)
person's body temperature followed by intensive supportive care.

Signs of Heat Stroke:

- Body temperature 104˚F or above
- Headache, dizziness, irritability
- Difficulty breathing
- Hot, red, dry skin
- Rapid, strong pulse initially, then weak and rapid
- Fainting, delirium or seizures may occur

What to do:
- **Seek medical attention at once**, then:
- Keep victim lying down in a cool place.
- Remove victim's clothing and cover with a wet sheet.
- Use air conditioner or fan to cool victim (see paragraphs on fans)
- Give nothing by mouth

Heat exhaustion is milder than heat stroke and typically occurs after several days of high temperatures. Although heat exhaustion is often severe enough to require hospitalization—especially of the elderly—death is uncommon. Treatment includes replacing fluid and electrolyte losses.

Signs of Heat Exhaustion:

- Normal or slightly elevated body temperature
- Pale, clammy skin
- Profuse sweating
- Tiredness and weakness
- Nausea, dizziness, and fainting possible

What to do:
- Lie down in cool area with head and shoulders lowered or legs elevated.
- Loosen clothing.
- Sip salt solution (one teaspoon of salt in 8-ounce glass of water).
- Drink plenty of non-alcoholic liquids.
- Seek medical attention for severe cases.

The most effective ways of avoiding heat-related illness include: reducing physical activity, drinking extra liquids and increasing the amount of time spent in air-conditioned environments. Heat-stressed persons who are unacclimatized often do not drink enough fluids to keep up with fluid losses; such people must make a conscious effort to drink extra fluids. People may also be able to reduce their risk for heat-related illness by scheduling physical activity during the cooler parts of the day, avoiding alcohol consumption, and remaining in air-conditioned environments as much as possible. Being in an air-conditioned environment, even for part of the day, will reduce the risk for heat stroke. The elderly and others at high risk should be encouraged and assisted to take advantage of air-conditioned heat-wave shelters or to seek relief from the heat in air-conditioned public places such as shopping malls.

Taking salt tablets is not recommended and can be harmful to people with such illnesses as high blood pressure and heart conditions.

Fans May Help or Harm:

Fans are less expensive than air conditioners and will increase comfort during hot weather, but when temperatures are very high they are not protective and may add to the body burden of heat. In order for a fan to be effective in cooling the body, the skin surface must be moist. When the skin surface is moist, moving air removes heat from the skin as the moisture evaporates. Unfortunately, when a person begins to develop heat stroke, they stop sweating and evaporative cooling stops. Also, elderly persons may not sweat due to poor heat regulation messages from the heat regulatory center in the brain. To restore the cooling effect of fans after sweating has stopped, it is essential to moisten the skin surface with damp cloths or to dampen the clothing.

Another problem with fans occurs as the air temperature rises to very high temperatures. As the air temperature approaches 100˚F, the air flow is increasingly ineffective in cooling the body and at temperatures exceeding 100˚F, the fan may be delivering overheated air to the skin at a rate that exceeds the capacity of the body to lose this heat even with sweating. The net effect is then to add heat rather than to cool the body. For this reason, the distribution of fans as part of heat wave relief, is not recommended. The better alternative, by far, when the temperature soars is to use an air conditioner if one is available or to seek shelter in an air-conditioned building.

REFERENCE:

National Center for Environmental Health, Centers for Disease Control and Prevention. Public health network message regarding heat-related illness dated July 12, 1993.

Surveillance of Heat-Related Illness

(continued from page 14)
The Department of Health issued a news release on June 30, 1994 cautioning Missourians on the safe use of fans.

In 1994, there were 14 heat-related deaths recorded, which was more than double the six heat-related deaths recorded in 1993. All heat-related deaths in 1993 and 1994 occurred in individuals age 45 and older, except for one death in 1993 in an infant under 1 year of age.

In 1994, 274 heat-related illnesses were reported, which was slightly higher than the 221 heat-related illnesses reported in 1993. The highest number of illnesses in 1994 was reported during the Fourth of July weekend and was associated with the VP Fair held in St. Louis. The second highest number of illnesses was reported during the statewide heat alert issued June 20–24.

As in past years, the St. Louis area accounted for the majority of reported heat-related illnesses and recorded heat-related deaths in 1994, accounting for 179 (65%) of the heat-related illnesses and 9 (64%) of the heat-related deaths. Public health authorities in the St. Louis metropolitan area declared three heat warnings during the summer of 1994, on June 19, July 5 and July 20.

How hot is it? Consider the humidity.

HEAT Index	Actual Temperature (F°)										
Relative Humidity	70°	75°	80°	85°	90°	95°	100°	105°	110°	115°	120°
0%	64°	69°	73°	78°	83°	87°	91°	95°	99°	103°	107°
10%	65°	70°	75°	80°	85°	90°	95°	100°	105°	111°	116°
20%	66°	72°	77°	82°	87°	93°	99°	105°	112°	120°	130°
30%	67°	73°	78°	84°	90°	96°	104°	113°	123°	135°	148°
40%	68°	74°	79°	86°	93°	101°	110°	123°	137°	151°	
50%	69°	75°	81°	88°	96°	107°	120°	135°	150°		
60%	70°	76°	82°	90°	100°	114°	132°	149°			
70%	70°	77°	85°	93°	106°	124°	144°				
80%	71°	78°	86°	97°	113°	136°					
90%	71°	79°	88°	102°	122°						
100%	72°	80°	91°	108°							

Apparent Temperature
Combined index of heat and humidity; or what it "feels like" to the body.

Source: National Oceanic and Atmospheric Administration

HOW TO USE THIS CHART: Across the top of the chart, locate the actual temperature. Down the left side of the chart, locate the relative humidity. Follow across and down to find the apparent temperature. The heat index (also called the apparent temperature) reflects the combined effect of temperature and humidity on the body. The table shows the apparent temperatures caused by various combinations of air temperature and humidity.

Apparent Temperature	Heat Stress Risk With Physical Activity and/or Prolonged Exposure
90° – 105°	Heat cramps or heat exhaustion ***possible***
105° – 130°	Heat cramps or heat exhaustion ***likely*** Heat stroke ***possible***
130° and up	Heat stroke ***highly likely***

This chart is designed to provide general guidelines for assessing the potential severity of heat stress. Individual reactions to heat will vary. Remember that heat illness can occur at lower temperatures than indicated on the chart. In addition, studies indicate that susceptibility to heat disorders tends to increase with age.

Summer Food Service Program

The Department of Health is seeking potential sponsors to operate the Summer Food Service Program (SFSP), and also is registering food service companies interested in contracting with sponsors. The program, which served 24,913 children in 1994, provides nutritious meals to needy children up to the age 18 during the summer months when school lunch and breakfast programs are not operating.

The Department of Health, which assumed full responsibility for the program last year, is encouraging more Missouri communities and organizations to get involved. During 1994, only nine percent of the needy children in the state took advantage of the program's benefits.

Sponsors eligible to run the Summer Food Service Program include public or private non-profit schools; residential summer camps; units of local, municipal, county or state government; and public or private non-profit colleges and universities operating a National Youth Sports Program. In addition, private non-profit organizations are also eligible to operate the SFSP in areas that are not currently served by another sponsor. Organizations wanting more details about site eligibility and program information should call 1 (800) 733-6251 or write to the Missouri Department of Health, Summer Food Service Program, P.O. Box 570, Jefferson City, Missouri 65102.

Meals and snacks provided by the sponsor are usually served to children in such places as churches, schools, playgrounds, camps, homeless sites, migrant areas and parks. Open sites are geographical areas where at least 50 percent of children residing in the area are eligible for free- or reduced-price meals under the National School Lunch Program guidelines.

Food service management companies interested in contracting with participating sponsors to provide meals or to operate the entire food service operation must register to participate. Companies should request an application form by contacting the Department of Health's Summer Food Service Program by phone at 1 (800) 733-6251 or by mail at P.O. Box 570, Jefferson City, Missouri 65102.

The Summer Food Service Program is operated without regard to race, color, national origin, age, sex or disability. Individuals who believe they may have been discriminated against for any of these reasons should write immediately to the Secretary of Agriculture, Washington, D.C. 20250.

The Centers for Disease Control and Prevention Requests Reports of Hemorrhage and Shock Associated with Invasive Pneumococcal Infection in Otherwise Healthy Persons

Excerpted from the Morbidity and Mortality Weekly Report (MMWR), January 6, 1995, Vol. 43, Nos. 51 & 52.

From December 1993 through May 1994, four previously healthy children (including two infants) in New Mexico developed a severe illness characterized by septic shock and hemorrhage into the skin or internal organs. An investigation subsequently implicated *Streptococcus pneumoniae* as the cause of illness. The two infants attended the same child care center (CCC) and died six weeks apart.

S. pneumoniae is the most common cause of invasive bacterial disease in the United States. The findings in New Mexico indicate that systemic pneumococcal infection in previously healthy children may be complicated by the rapid onset of septic shock accompanied by hemorrhage into the skin or other organs. Overwhelming sepsis with hemorrhagic complications has been well documented in persons who are asplenic and in adults with underlying medical conditions. However, reports of hemorrhage and shock associated with pneumococcal septicemia in previously healthy children have been limited and have included cases in a previously healthy 13-month-old who developed fatal Waterhouse-Friderichsen syndrome; two children with purpura fulminans; and two children with pneumococcal septicemia, shock and hemorrhagic complications.

Because cerebral spinal fluid (CSF), blood, and tissue cultures were negative, determining the etiology of the four cases in New Mexico required use of alternative diagnostic methods. Latex agglutination testing is performed on CSF specimens of some patients with suspected bacterial meningitis. Counterimmunoelectrophoresis (CIE), a technique not commonly used, is highly specific for most pneumococcal serogroups when used on CSF specimens, but its sensitivity may be lower than that of other methods. The validity of polymerase chain reaction (PCR) using primers for the pneumococcal autolysin gene on autopsy tissue has not been evaluated.

Although the most common pneumococcal diseases in persons in CCCs include otitis media and sinusitis, transmission of invasive pneumococcal disease in this setting has been reported previously. The report of the two deaths among children who attended the New Mexico CCC underscores the need to improve prevention of pneumococcal disease transmission in CCCs. However, until a vaccine effective in children aged <2 years is developed and licensed, substantial morbidity from pneumococcal infections among children in CCCs will probably continue to occur.

The incidence of hemorrhage and shock as a complication of pneumococcal infection in healthy children is unknown. Identification of *S. pneumoniae* as the etiology of infection in a child with this presentation is difficult when cultures are negative and other diagnostic tests are not performed. The Centers for Disease Control and Prevention (CDC) recommends the following case definition to facilitate further study and reporting of this illness; septic shock, hemorrhage into the skin (petechiae or purpura) or Waterhouse-Friderichsen syndrome, and evidence of pneumococcal infection in an otherwise healthy person. Evidence of pneumococcal infection may include isolation of pneumococci from sterile body fluids or detection of pneumococci by nonculture methods. If CSF or autopsy tissues are available and routine diagnostic tests are negative, CDC can assist with detection or characterization of pneumococci.

Physicians and other health-care providers are encouraged to report patients with this clinical presentation to the Missouri Department of Health at (800) 392-0272.

Tick-borne Disease Awareness

(continued from page 6)

ehrlichiosis cases compared to 88 percent of RMSF cases.

- More than 50 percent of cases have leukopenia, thrombocytopenia and mildly elevated liver function tests, specifically aspartate transaminase and alanine transaminase.
- Most patients have reported tick bites one to three weeks prior to onset of symptoms.

The diagnosis of ehrlichiosis is suggested by signs and symptoms compatible with ehrlichiosis and a history of tick bite. It is confirmed by indirect fluorescent antibody testing for antibodies against *E. chaffeensis*. Diagnosis currently requires a greater than or equal to fourfold increase/decrease in antibody titer to *E. chaffeensis* in acute- and convalescent-phase serum samples.

Sera from patients with suspected RMSF diagnoses who fail to develop specific RMSF antibodies, and from other patients with a documented febrile illness compatible with ehrlichiosis, should be submitted to the Department of Health State Public Health Laboratory. The patient's clinical history should accompany the specimens. Paired sera (collected preferably two to four weeks apart) will be forwarded to the Centers for Disease Control and Prevention (CDC) for testing. CDC will not test single serum specimens.

Treatment

Treatment of ehrlichiosis is usually tetracycline (25–50 mg/kg/day) orally in four divided doses for 7–10 days, which is the same dose and schedule as recommended for RMSF. Additionally, doxycycline and minocycline have been suggested as alternative therapies.

Control/Prevention

Avoid unnecessary exposure to ticks. Follow instructions for proper removal of ticks given in this article on pages 1 and 2 of this issue.

State Public Health Laboratory Report

Newborn Screening — Hypothyroidism, Phenylketonuria, Galactosemia and Hemoglobinopathies

James Baumgartner, B.S., M.B.A., Chief, Metabolic Disease Unit

	Sep 94	Oct 94	Total YTD
Specimens Tested	10,443	9,676	99,977
Initial (percent)	63.8%	63.0%	64,278
Repeat (percent)	36.2%	37.0%	35,699
Specimens: Unsatisfactory	143	164	1,256
HT Borderline	620	630	7,542
HT Presumptive	29	35	367
PKU Borderline	8	31	111
PKU Presumptive Positive	1	2	5
GAL Borderline	133	123	1,070
GAL Presumptive Positive	1	5	32
FAS (Sickle cell trait)	87	67	887
FAC (Hb C trait)	20	20	244
FAX (Hb variant)	10	12	110
FS (Sickle cell disease)	5	1	20
FSC (Sickle C disease)	2	0	5
FC (Hb C disease)	0	1	4

	Nov 94	Dec 94	Total YTD
Specimens Tested	9,891	9,600	119,468
Initial (percent)	64.9%	64.3%	76,869
Repeat (percent)	35.1%	35.7%	42,599
Specimens: Unsatisfactory	169	131	1,556
HT Borderline	747	855	9,144
HT Presumptive	43	42	452
PKU Borderline	28	19	158
PKU Presumptive Positive	2	1	8
GAL Borderline	115	85	1,270
GAL Presumptive Positive	2	3	37
FAS (Sickle cell trait)	81	74	1,042
FAC (Hb C trait)	23	25	292
FAX (Hb variant)	15	10	135
FS (Sickle cell disease)	2	2	24
FSC (Sickle C disease)	1	0	6
FC (Hb C disease)	1	0	5

HT = Hypothyroidism, PKU = Phenylketonuria, GAL = Galactosemia, Hb = Hemoglobin, YTD = Year to Date

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The Managing Editor is H. Denny Donnell, Jr., MD, MPH, State Epidemiologist, assisted by Bill Schmidt, MPH, Director, and Mahree Skala, MA, Deputy Director, of the Division of Environmental Health and Epidemiology. Diane C. Rackers is the Production Manager. Questions or comments should be directed to (314) 751-6128 or toll free (800) 392-0272

Alternate forms of this publication for persons with disabilities may be obtained by contacting the Missouri Department of Health, Division of Environmental Health and Epidemiology, P.O. Box 570, Jefferson City, MO 65102, (314) 751-6128. TDD users can access the preceding phone number by calling (800) 735-2966.

This newsletter can be recycled.

Childhood Lead Poisoning Prevention Program

The Missouri Childhood Lead Poisoning Prevention Program in coordination with the State Public Health Laboratory has implemented an expansion of the laboratory services. The laboratory will now analyze blood specimens for lead levels sent from private physicians across the state of Missouri. To provide accurate data collection and distribution, screen as many children as possible, and receive results in a more timely manner, **lab supplies and services will be provided free of charge to participating physicians**.

The Childhood Lead Poisoning Prevention Program has hired Susan Oliver, Health Program Representative I, to promote this program. Susan will be traveling throughout the state visiting physician offices to educate them about the program and train key personnel on specific screening requirements. In support of the 1993 mandate requiring lead testing of all Medicaid enrolled children, Susan will be targeting specific physician offices for their pediatric Medicaid populations. Although the initial target will be specific, the program goal is to screen as many children as possible regardless of insurance status.

If you would like additional information, or have any questions, please contact:

Susan Oliver
Missouri Department of Health
Bureau of Environmental Epidemiology
P.O. Box 570, 210 El Mercado
Jefferson City, MO 65102
Ph: (314) 526-4911 or (800) 575-9267

Missouri EPIDEMIOLOGIST

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Bureau of Communicable Disease Control 1994 Annual Report

Michael Fobbs, B.A.
Bureau of Communicable Disease Control

Enteric Diseases

There were 40 *E. coli* O157:H7 cases reported during 1994, the second complete year of reporting for this disease. The Southeastern District had the highest case rate at 1.6 cases per 100,000 population followed by the Southwestern and Eastern districts at 0.9 per 100,000. Lower rates were seen in the other districts. See Figure 1. There is still significant under-detection and under-reporting of this pathogen, which prospective studies in other states have found to be more common than *Shigella*.[1]

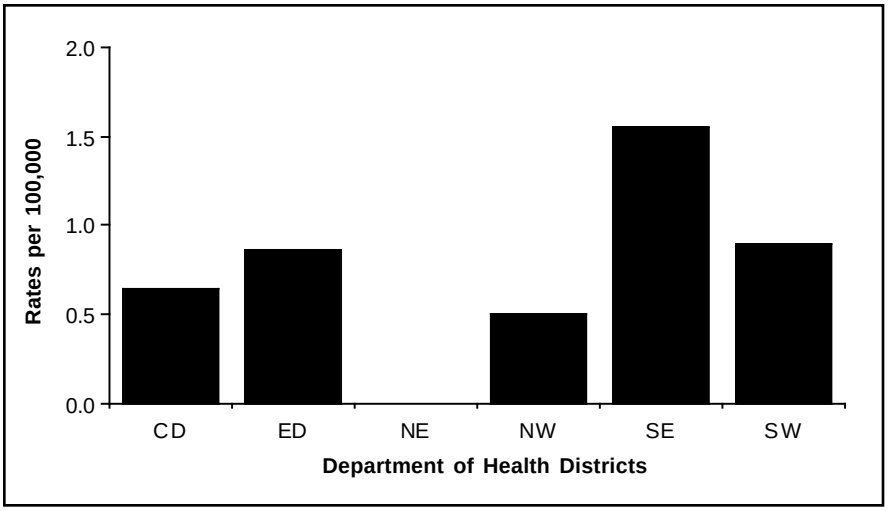

Figure 1. *E. coli* O157:H7 incidence rates per 100,000 by Department of Health district, Missouri, 1994.

Reported *Campylobacter* cases increased from 616 cases in 1993 to 631 cases in 1994, an increase of 2.4 percent. The 1994 total was 4.8 percent higher than the five-year median of 547 cases See Figure 2. Central, Eastern and North-

(continued on page 2)

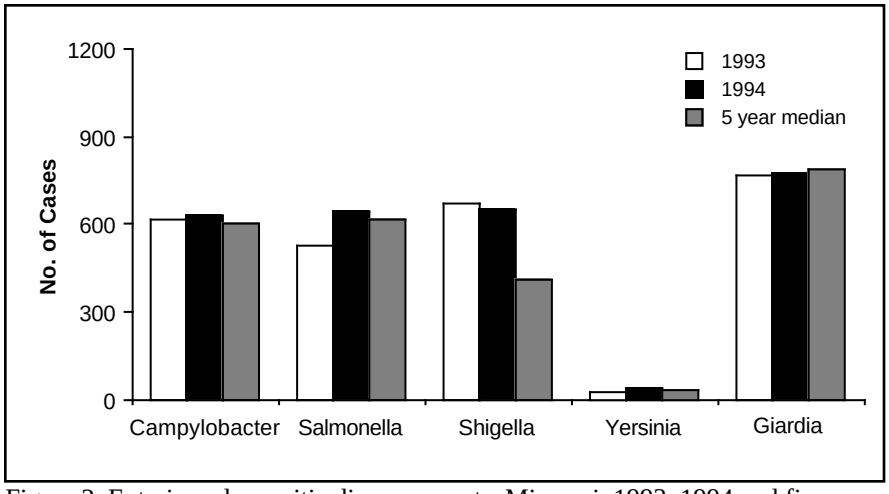

Figure 2. Enteric and parasitic disease reports, Missouri, 1993, 1994 and five-year median.

Inside this Issue...

(continued from page 1)
eastern districts showed increases in the numbers of reported cases while the other districts reported decreases. See Figure 3.

Reported cases of salmonellosis increased in 1994 in all districts except the Northeastern and Southeastern. See Figure 3. The number of reported cases rose 21.4 percent, from 529 in 1993 to 642 in 1994. The 1994 total is 4.2 percent above the five-year median of 616 cases. See Figure 2. The most common serotypes of *Salmonella* reported in 1993 and 1994 are shown in Table 1.

In 1994 the reported incidence of Shigellosis decreased by 3.0 percent from 674 cases in 1993 to 654 cases in 1994. Reductions in the number of reported cases were seen in the Eastern and Southeastern districts, with increases in the other districts. See Figure 3. The 1994 statewide incidence was 59.1 percent higher than the five-year median of 411 cases. See Figure 2.

The number of reported cases of yersiniosis increased 53.8 percent from 26 cases in 1993 to 40 cases in 1994. These 40 cases are 11.1 percent above the five-year median of 36 cases. See Figure 2. In previous years, the largest numbers of cases were reported among children in the Eastern and Northwestern districts; the Eastern district reported the largest number of cases in 1994. In addition, during 1994 there was a 500 percent (one case to six cases) increase in Central District. See Figure 3.

Table 1. Most common *Salmonella* serotypes, Missouri, 1993 and 1994

	1993			1994		
	Serotype	No. of Cases	Percent	Serotype	No. of Cases	Percent
1.	*S. typhimurium*	148	28.0%	*S. typhimurium*	155	24.1%
2.	*S. enteritidis*	57	10.8%	*S. enteritidis*	52	8.1%
3.	*S. heidelberg*	37	7.0%	*S. brandenburg*	51	7.9%
4.	*S. newport*	27	5.1%	*S. agona*	31	4.8%
5.	*S. braenderup*	18	3.4%	*S. newport*	25	3.9%
6.	*S. hadar*	13	2.5%	*S. heidelberg*	24	3.7%
7.	*S. thompson*	11	2.0%	*S. thompson*	21	3.3%
8.	*S. montevideo*	10	1.9%	*S. hadar*	17	2.6%
9.	*S. muenchen*	8	1.5%	*S. senftenberg*	16	2.5%
10.	*S. agona*	6	1.1%	*S. norwich*	15	2.3%
	S. bareilly	6	1.1%			
	S. infantis	6	1.1%			
	S. tennessee	6	1.1%			
	All Others	176	33.3%	All Others	235	36.6%
	Total	**529**	**100.0%**	**Total**	**642**	**100.0%**

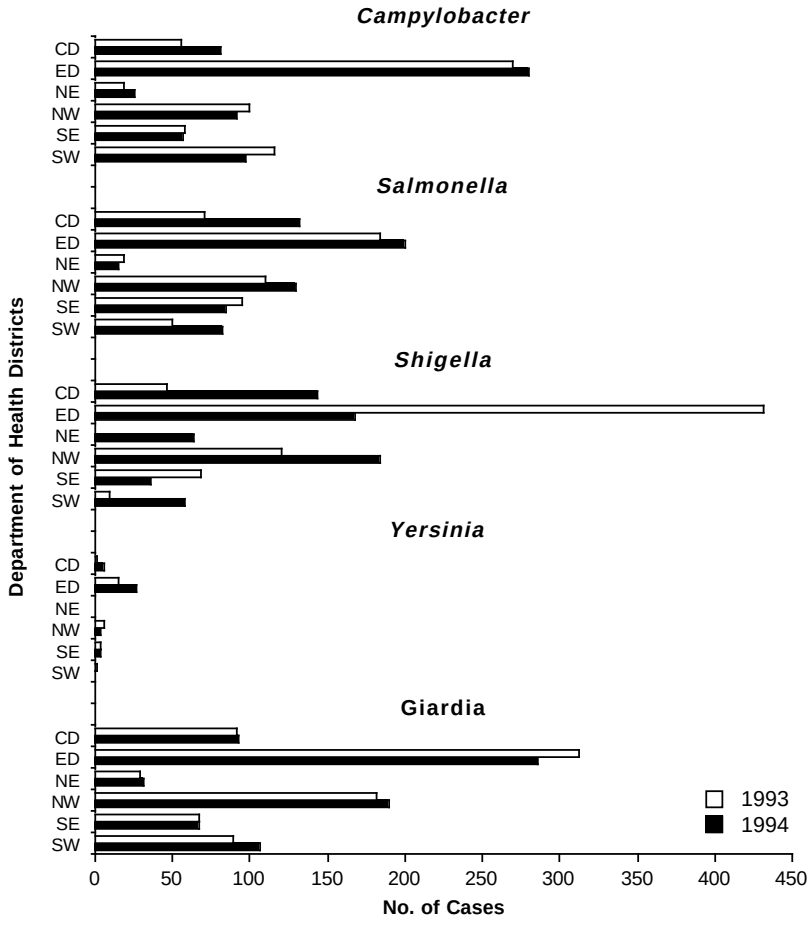

Figure 3. Enteric and parasitic disease reports by Department of Health district, Missouri, 1993 and 1994.

Key to Department of Health Districts:

CD = Central District
ED = Eastern District
NE = Northeastern District
NW = Northwestern District
SE = Southeastern District
SW = Southwestern District

The map on page 18 depicts the division of counties into Department of Health districts.

Parasites

There were 774 reported cases of giardiasis reported in 1994, which is essentially unchanged from 1993. This is 2.0 percent below the five-year median of 790 cases. See Figure 2. Reported cases increased during 1994 in the Central, Northeastern, Northwestern and Southwestern districts, with decreases being seen in the other areas of the state. See Figure 3.

Viral Hepatitis

Reported cases of hepatitis A in Missouri decreased by 57.1 percent from 1,443 in 1993 to 619 in 1994. The 619 cases from 1994 were 23.6 percent lower than the five-year median of 810 cases. See Figure 4. In the last quarter of 1992, the number of cases of hepatitis A in the Eastern District underwent a dramatic increase, signaling the start of a major outbreak. The outbreak ran from the last quarter of 1992 to the first few months of 1993. It is encouraging that the number of cases of hepatitis A reported in the Eastern District dropped dramatically from 1,144 in 1993 to 424 in 1994. See Figure 5. Reductions in the numbers of reported cases were also seen in the Central, Northwestern, Southeastern and Southwestern districts.

Hepatitis B cases decreased by 8.0 percent, from 585 cases in 1993 to 538 cases in 1994. The five-year median for hepatitis B cases in Missouri is 585. See Figure 4. All districts reported decreases in the number of reported cases for 1994 except the Northeastern and Southwestern districts. See Figure 5.

Meningitis

There was a 24.6 percent increase in reported cases of meningococcal meningitis from 34 cases in 1993 to 43 cases in 1994. The 43 cases reported in 1994 are 34.4 percent above the five-year median of 32 cases. See Figure 4. The Eastern, Northeastern and Northwestern districts had increases in the number of reported cases in 1994. See Figure 6.

Reported cases of aseptic meningitis were down 36.4 percent, from 275 in

(continued on page 31)

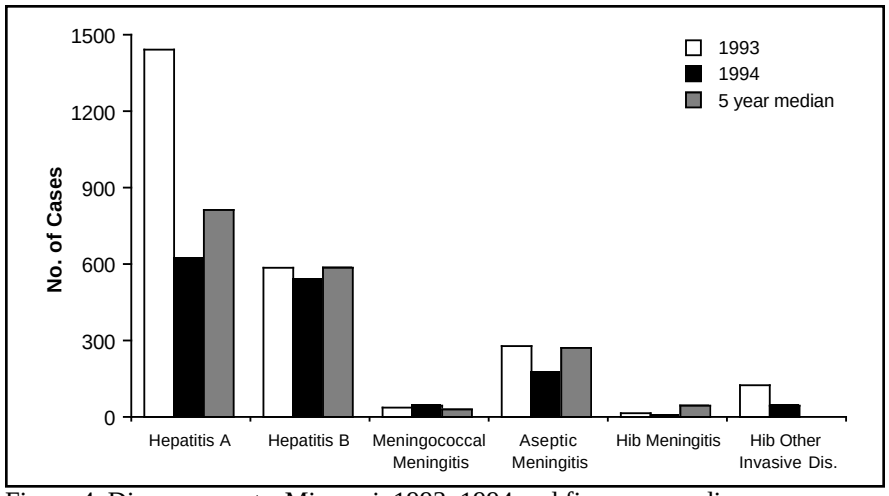

Figure 4. Disease reports, Missouri, 1993, 1994 and five-year median.

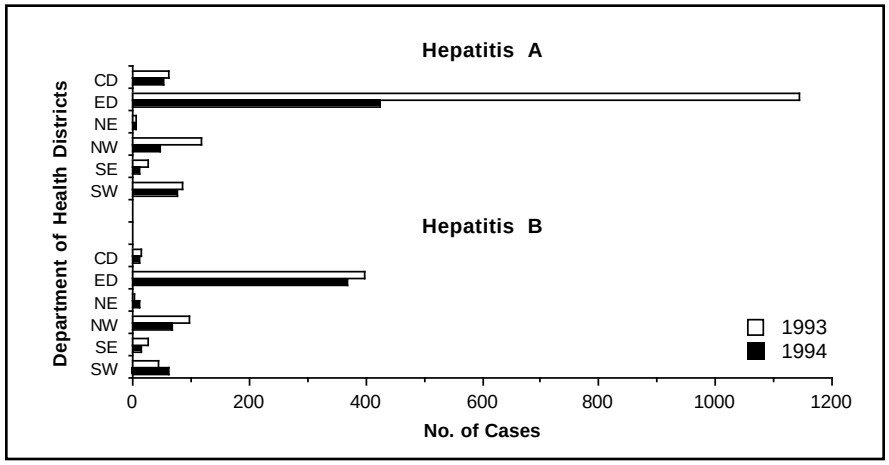

Figure 5. Hepatitis reports by Department of Health district, Missouri, 1993 and 1994.

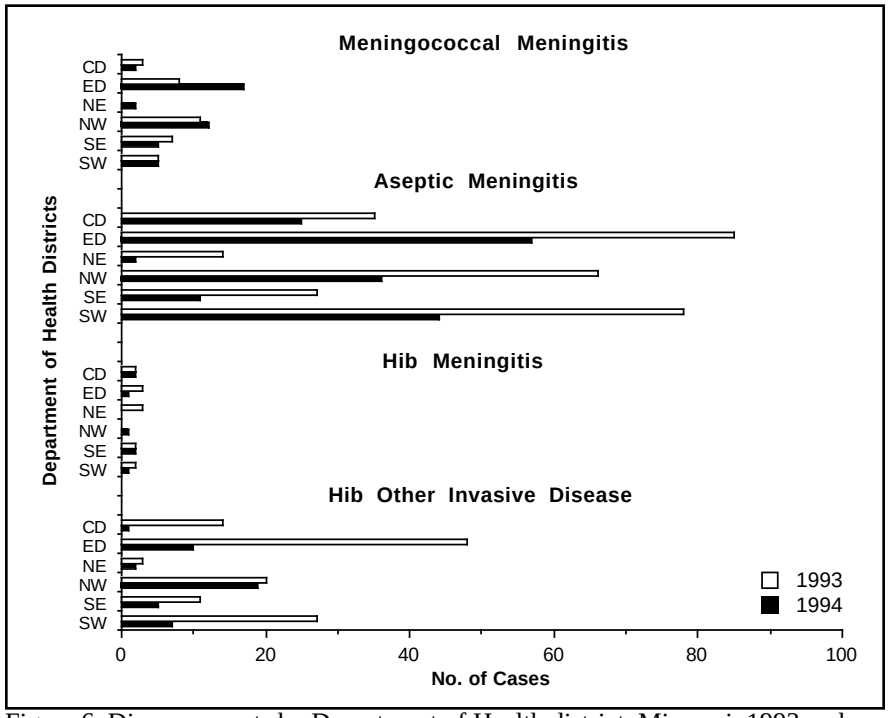

Figure 6. Disease reports by Department of Health district, Missouri, 1993 and 1994.

Outbreaks of Communicable Disease in 1994*

Michael Fobbs, B.A.
Bureau of Communicable Disease Control

In 1994, there were 65 communicable disease outbreaks reported in Missouri involving 1,183 people. This represents a 43.2 percent increase from the 44 outbreaks reported in 1993. Disease outbreaks in 1994 involved widely varying etiologic agents and several different modes of transmission, and they occurred in a variety of settings. The modes of transmission were: 32 foodborne, 22 suspected person-to-person, 4 waterborne and 3 undetermined. There were also two exposures to agents in the environment, one exposure to a bird vector and one suspected worksite transmission.

During 1994, restaurants were the most common settings for outbreaks, accounting for 18 (27.7%) of the 65 reported outbreaks, schools were next with 11 outbreaks (16.9%); daycare settings were involved in 7 outbreaks (10.8%), community-wide outbreaks occurred 6 (9.2%) times, outbreaks occurred in the home and in hotels in 5 (7.7%) instances each; and occupational settings accounted for four outbreaks (6.2%). Two outbreaks (3.1%) were associated with catered events, unlike two years ago when there were 6 such events. Two outbreaks (3.1%) were associated with church events. One outbreak each occurred in a camp, a club, a hospital outreach clinic, a houseboat, a prison and an undefined business meeting. The different outbreaks are shown in Table 1 by cause, setting and number of cases.

The largest single event during 1994 was a foodborne outbreak of acute gastrointestinal illness of unknown etiology which affected approximately 100 individuals in a hotel. The largest pro-

*Excludes outbreaks related to HIV, sexually transmitted diseases, tuberculosis and vaccine-preventable diseases. These disease outbreaks are covered in other articles in this issue.

Table 1. Communicable disease outbreaks by cause, setting and number of cases, Missouri, 1994

Disease/ Mode of Transmission	No. of Outbreaks	Setting	No. of Cases
AGI*			
Foodborne	23	CH, 2CT, DC, 2F, 2H, O, P, 12R, S	408
Person-to-Person	4	F, CA, 2S	176
Shigellosis			
Person-to-Person	8	3C, 5DC	229
Salmonellosis			
Foodborne	6	C, CH, F, 3R	85
Hepatitis A			
Person-to-Person	2	C, F	10
Foodborne	1	R	29
Meningococcal Infections			
Person-to-Person	2	C, S	4
Pediculosis			
Person-to-Person	1	2S	55
Scabies	2	2S	40
Cryptosporidiosis	1	H	20
Streptococcal Pneumonia	1	S	20
Metallic Poisoning	1	S	18
Pneumonia	1	S	18
ARI**	1	W	15
Copper Poisoning	1	R	15
Schistosomiasis (suspect)	1	O	10
Staphylococcus	1	H	8
Organic Chemical	1	R	5
Campylobacteriosis	1	W	4
Giardiasis	1	DC	3
Legionellosis	1	CL	3
Viral Meningitis	1	W	3
Psittacosis	1	W	2
Fifth Disease	1	H	***
TOTAL	**65**		**1,183**

*Acute gastrointestinal illness of unknown etiology
**Acute respiratory illness of unknown etiology
***Unknown number of ill related to clinic, over 230 individuals contacted

Key

C	Community	DC	Daycare	R	Restaurant
CA	Camp	F	Family Gathering	S	School
CH	Church Event	H	Hotel	W	Workplace
CL	Club	O	Other		
CT	Catered Event	P	Prison		

portion of outbreaks reported during the year consisted of acute gastrointestinal illness of unknown etiology (AGI); 27 such outbreaks affecting 584 people were reported. Foodborne transmission was the most common means of spread, and was implicated in 23 of these outbreaks. Four AGI outbreaks resulted from suspected person-to-person transmission, and one outbreak was waterborne. AGI outbreaks occurred in the following settings: 12 restaurants, 3 schools, 3 homes, 2 hotels, 2 catered events, and a single AGI outbreak was seen in each of the following: daycare center, summer camp, prison, church and business meeting.

Shigellosis was reported as the causative agent for eight outbreaks involving 229 people. Five outbreaks of shigellosis occurred in daycare centers; three outbreaks were community-wide. All eight shigellosis outbreaks involved person-to-person transmission.

Salmonellosis was the causative agent in six outbreaks that affected an estimated 85 people. All of the outbreaks were the result of foodborne transmission. Three outbreaks occurred in a restaurant, one in a church, one in a home and one was community-wide.

Three hepatitis A outbreaks affecting 39 people were reported. Transmission of the virus was from person-to-person in two of the outbreaks and foodborne in the other. The settings were a community, a home and a restaurant.

There were two outbreaks of meningococcal infection affecting a total of four people in a school and a community.

Pediculosis was responsible for outbreaks in two schools involving 55 people.

An outbreak of cryptosporidiosis, affecting 20 people, was associated with a hotel swimming pool.

A suspected outbreak of Fifth disease in a hospital clinic resulted in over 230 people being questioned and 60 serum specimens being obtained for testing. It was subsequently found that the community was experiencing cases of Fifth disease. However, it could not be determined whether the cases were only associated with this particular clinic.

Table 2. Nosocomial outbreaks and investigations by cause, setting and number of cases, Missouri, 1994

Disease/ Mode of Transmission	No. of Outbreaks	Setting	No. of Cases
Scabies	18	17NH, SH	306
ARI*	6	6NH	304
AGI**			
Person-to-Person	5	C, 4NH	306
*Staphylococcus aureus****			
Person-to-Person	3	H, 2NH	28
Salmonellosis			
Person-to-Person	2	H, NH	20
Food	1	H	21
Pediculosis	3	3NH	103
Group A *Streptococcus*	2	2NH	17
Influenza-like	2	2NH	32
Norwalk Virus	1	NH	82
Small Round Virus	1	NH	65
Influenza	1	NH	60
Conjunctivitis	1	NH	6
Herpes Zoster	1	NH	4
Chickenpox	1	NH	2
TOTAL	**48**		**1,356**

*Acute respiratory illness of unknown etiology
**Acute gastrointestinal illness of unknown etiology
***Methicillin-resistant *Staphylococcus aureus*

Key
C Community
H Hospital
NH Nursing Home
O Other Health Care Facility
SH Shelter

1994 Nosocomial Outbreaks

Hospitals, nursing homes and other long-term-care facilities in Missouri reported 48 institutionally-acquired (nosocomial) outbreaks of communicable disease during 1994. This represents an increase of 4.3 percent from the 46 outbreaks reported in 1993. The 48 outbreaks reported in 1994 involved a total of 1,356 cases of illness.

In 47 of the 48 (98.0 percent) outbreaks, transmission of disease was suspected to be from person-to-person. The remaining outbreak was suspected to have been foodborne. Nursing homes were the setting for 42 (88%) of the outbreaks and hospitals for 4 (8.3%) of the outbreaks. One outbreak (2.1%) was associated with disease in the community, and one outbreak (2.1%) occurred in a sheltered workshop setting. Table 2 describes the outbreaks by disease, setting and number of cases.

Scabies accounted for 18 (37.5%) of the 48 outbreaks, and involved 306 people.

(continued on page 14)

Hazardous Substances Emergency Events Surveillance (HSEES) 1994 Annual Report October 1, 1993–September 30, 1994

Lori Harris
Bureau of Environmental Epidemiology

Background of HSEES System

While many national data bases are designed to obtain information on hazardous substance emergencies, they often only contain data on a small proportion of the emergencies that occur each year. In addition, they offer very little information about the public health consequences of such events. They do not describe the many variables that are associated with this morbidity and mortality, nor do they identify populations affected (e.g., employees, responders, general public). Consequently, a surveillance system focusing on the direct public health impact of hazardous substance emergencies was established in 1990 by the Agency for Toxic Substances and Disease Registry (ATSDR).

The Hazardous Substances Emergency Events Surveillance (HSEES) system was established to:

- Describe the distribution and characteristics of hazardous substances emergencies;
- Describe the morbidity and mortality experienced by employees, responders and the general public;
- Identify risk factors associated with the morbidity and mortality; and
- Identify strategies that may reduce future morbidity and mortality from the release of hazardous substances.

A hazardous substance release is entered into the HSEES system if it meets the following criteria:

1. An uncontrolled or illegal release or threatened release of one or more hazardous substances; **and**
2. The substances that are actually released or threatened to be released include **ALL** hazardous substances, except petroleum products; **and**
3. The quantity of the hazardous substances which are released, or are threatened to be released, need (or would need) to be removed, cleaned up or neutralized according to federal, state or local law; **or**
4. Only a threatened release of hazardous substances exists, but this threat leads to an action, such as an evacuation, that can potentially impact on the health of employees, responders or the general public. This action makes the event eligible for inclusion into the surveillance system even though the hazardous substances are not released.

Data collection for the Missouri HSEES system began October 1, 1993. Information collected includes:

- Where and when the event occurred, including whether the event took place at a fixed facility or during the transportation of the substance;
- Weather conditions, time of day and day of the week when the event occurred;
- Substance(s) and quantity released or threatened to be released;
- Data related to possible exposure, such as proximity to residential areas; the primary use of the nearby land (e.g., commercial, industrial, agricultural or residential); the number of people living within one-quarter, one-half and one mile of the event; and how many people were actually home when the release took place;
- Deaths and injuries that resulted from the event, including who was injured (e.g., employee, general public, responder), the number and severity of injuries and steps that may have been taken to prevent deaths and injuries, (e.g., type of personal protective equipment that the injured used, use of decontamination, evacuation and in-place sheltering).

All Missouri HSEES data is transmitted to ATSDR for analysis with the data from the other 11 participating states. Personal/company identifiers are not transmitted to ATSDR to protect the confidentiality of program participants.

Because the intent of the HSEES program is to reduce the morbidity and mortality related to hazardous substances emergency events, it is important that the public, emergency responders, employees and industries receive information concerning case investigations. For those cases where intervention strategies can be developed which would prevent similar future incidents, specific summary investigation reports also will be produced and distributed to the community involved. Where appropriate, health education programs will be conducted to promote the prevention strategies.

Analysis of Data on Hazardous Substances Emergency Events

The Missouri Department of Natural Resources Environmental Services Program maintains Environmental Emergency Response (EER) reports. All environmental emergencies are to be reported to a 24-hour response line at (314) 634-2436. A total of 2,017 reports were received from October 1, 1993–September 30, 1994. Of these, 966 (48%) were petroleum related, leaving 602 potential hazardous substances emer-

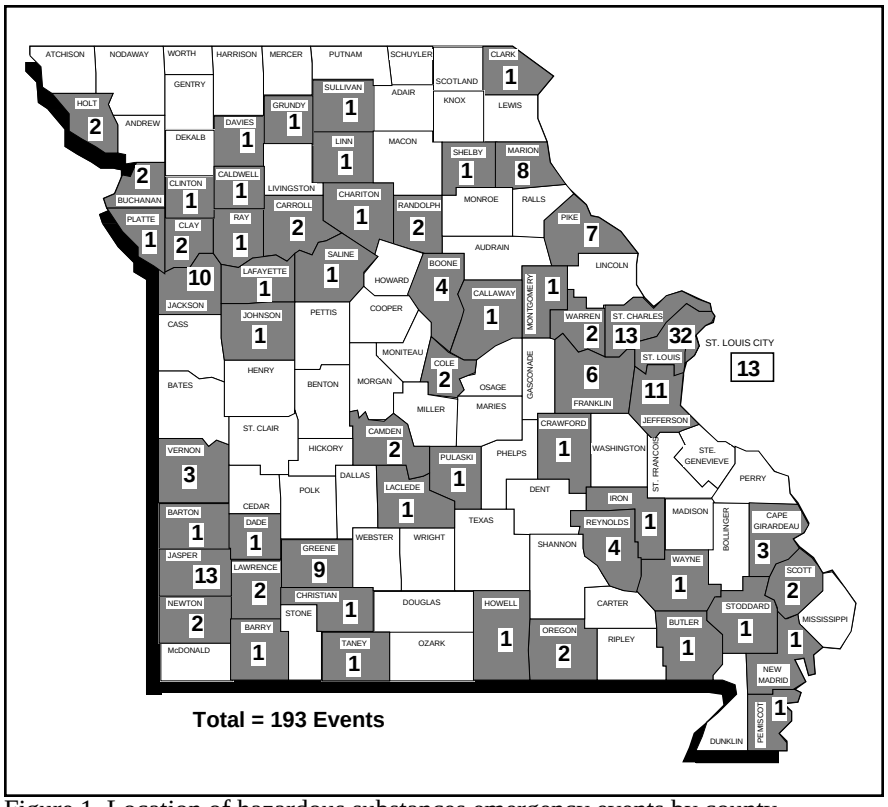

Figure 1. Location of hazardous substances emergency events by county, Missouri HSEES, October 1, 1993–September 30, 1994.

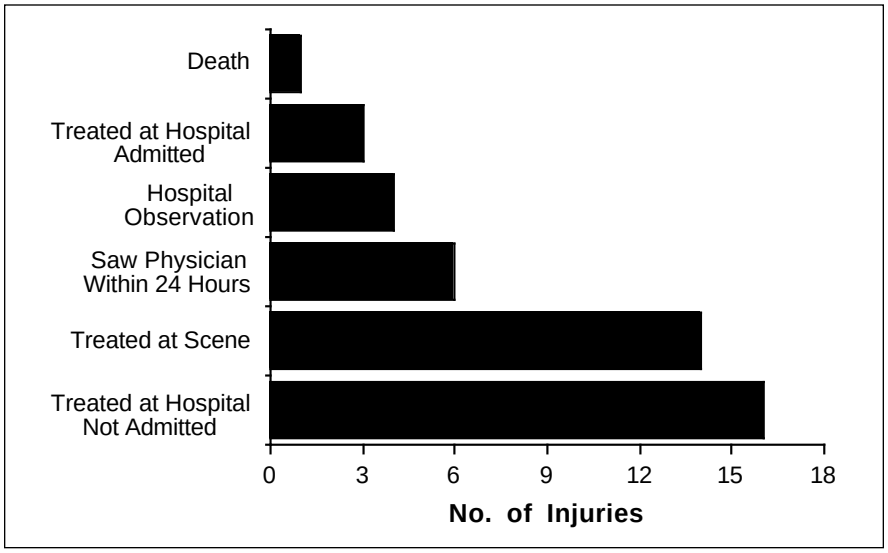

Figure 2. Number of injuries reported by severity, Missouri HSEES, October 1, 1993–September 30, 1994.

gency events. From these 602 reports, investigations and report forms were completed for 215 events which actually involved hazardous substances. One hundred ninety-three (90%) events met the HSEES case definition.

Event locations were scattered throughout the state, occurring in 56 counties and the City of St. Louis. This represents nearly 50 percent of the state. Figure 1 shows the number of events occurring in each county.

Of all events, 157 (81%) occurred on weekdays. Thirty-six events (19%) occurred on the weekend. More than half the events, 126 (65%), occurred between 6 a.m. and 6 p.m. with 105 (54%) of the 126 events occurring between the core working hours of 8 a.m. and 5 p.m.

Evacuations were ordered in 25 (13%) events. The number of people evacuated was known for 20 events and unknown for 5 events. From these 20 events, 622 people were evacuated. Of known people evacuated, the range of people affected was from 1–160 in any single event. Seventeen of the evacuations involved the evacuation of people from an affected building(s) or part of a building, four were circle/radius evacuations, two were downwind evacuations and two had no criteria. A total of 35 substances were released in these 25 events. One event involved employees who left work because of a release, but no official evacuation was ordered.

Twenty-two (11%) releases resulted in 43 victims and 1 death. See Figure 2. The largest number of victims associated with a release was four. The most common type of injury reported was respiratory irritation, which occurred in 19 (43%) of the victims. Other types of injuries experienced included eye irritation, chemical burns, thermal burns, skin irritation, dizziness, vomiting and other (e.g., taken to the hospital for observation, hysteria, nervousness). See Figure 3.

Of the 44 victims, one victim died, 14 were treated at the scene, 16 were treated at but not admitted to a hospital, 3 were admitted to a hospital and 4 were taken to a hospital for observation. Six people saw a private physician within 24 hours.

Employees were the largest group injured by releases; twenty-nine employees were injured and one died. Responders were second in number of injuries and the general public had the least number of injuries. See Figure 4. Nine-

(continued on page 8)

(continued from page 7)
teen substances were released in the 22 events where injuries occurred. Ammonia was involved with the greatest number of injuries 14 (32%). This was followed by chlorine with 6 (14%) injuries and TCE with 4 (9%) injuries.

We are indebted to the Department of Natural Resources Environmental Services Program for helping us investigate these hazardous substances release events. We rely heavily on this unit for notification of releases and frequently contact them for circumstances surrounding a release.

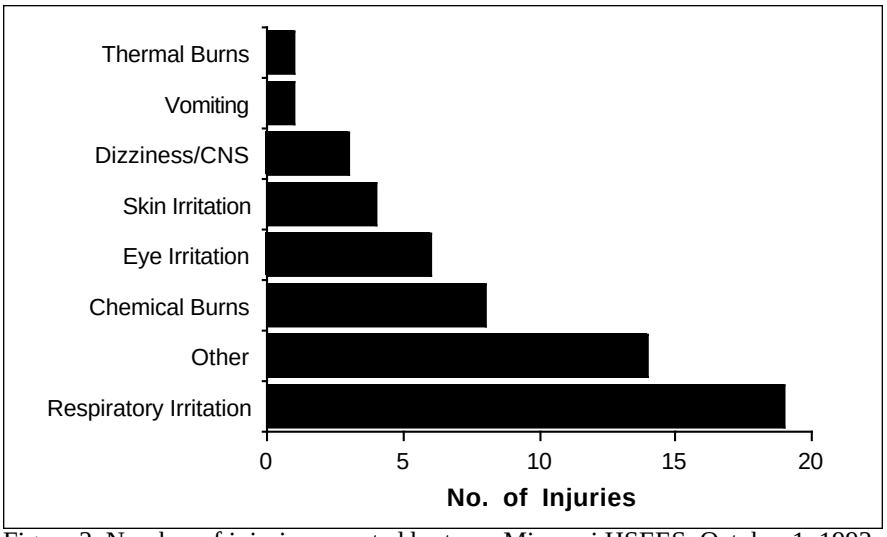

Figure 3. Number of injuries reported by type, Missouri HSEES, October 1, 1993–September 30, 1994.

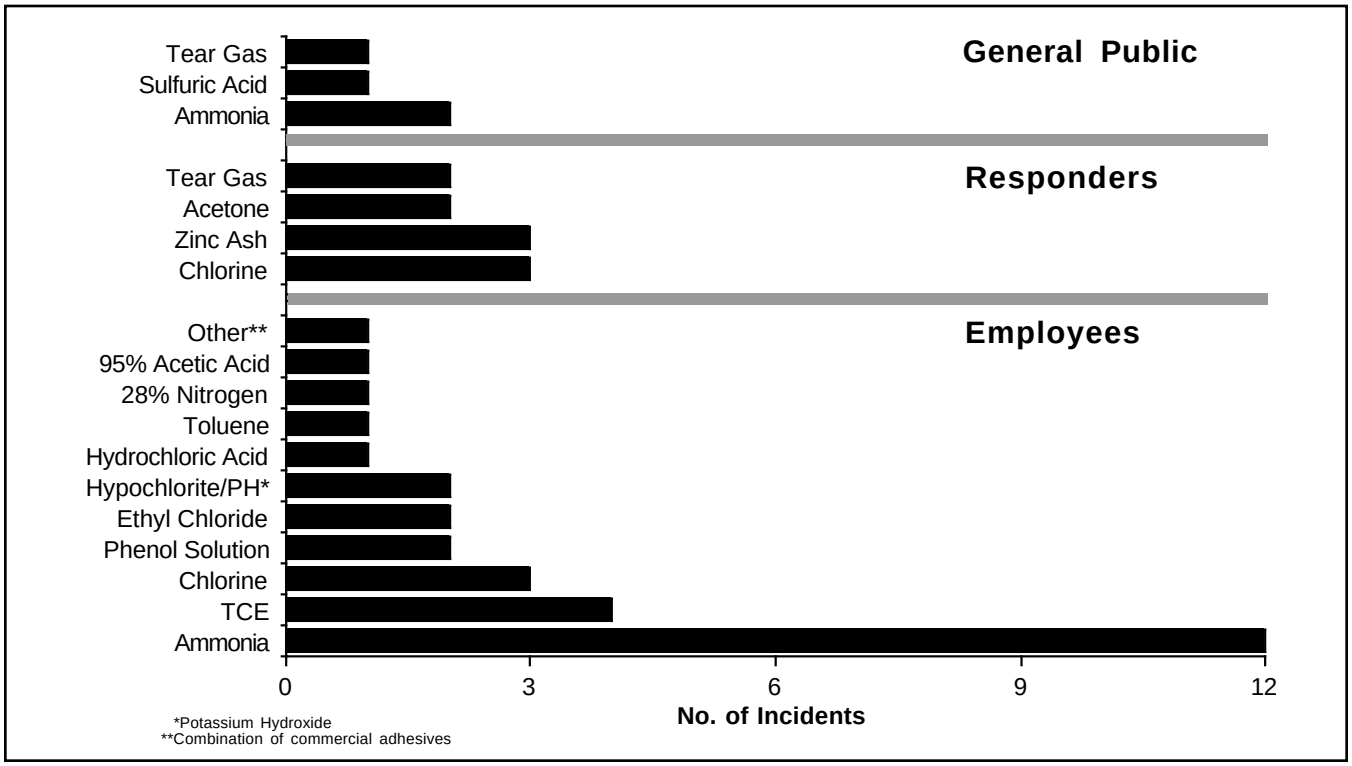

Figure 4. Number of incidents reported by substance and type of victim, Missouri HSEES, October 1, 1993–September 30, 1994.

If you are aware of any non-petroleum hazardous substances releases that may not have been reported to the Department of Natural Resouces, please contact:

Lori J. Harris, HSEES Coordinator
Missouri Department of Health
P.O. Box 570
Jefferson City, MO 65102-0570
Ph: (314) 751-6111 or (800) 392-7245

State Public Health Laboratory - 1994 Annual Report

Metabolic Disease Screening

	1993	1994
Infants screened	**78,351**	**76,869**
Presumptive positives:		
PKU	14	8
Hypothyroidism	328	454
Galactosemia	39	37
Sickle Cell	28	24
Other hemoglobinopathies	1,631	1,483

Microbiology

Enterics	**1,362**	**2,627**
Salmonella	486	731
Shigella	328	300
Campylobacter jejuni	23	33
E. coli O157:H7	37	46
Parasitology	**2,227**	**2,722**
Ova/parasites found	507	696
Entamoeba histolytica	15	12
Giardia lamblia	125	203
Ascaris lumbricoides	39	81
Hookworm	24	51
Trichuris trichura	24	36
Reference Bacteriology	**3,160**	**1,603**
Francisella tularensis	5	5
Haemophilus influenzae	62	12
Neisseria meningitidis	50	67
Bordetella pertussis	141	57
Neisseria gonorrhoeae	--	37
DNA Probe for Chlamydia/Gonorrhoeae	**42,201**	**107,395**
N. gonorrhoeae	616	992
Chlamydia trachomatis	2,760	4,601

Serology/Virology

HIV Serology	**85,439**	**161,935**
HIV antibody positive	1,051	1,010
Syphilis Serology	**16,703**	**29,222**
Sero-confirmed reactive	1,477	1,409
Hepatitis A Serology	**1,529**	**458**
Positive	251	43
Hepatitis B Serology	**6,742**	**8,846**
Acute cases	3	978
Infectious patients	204	117
Not infectious but exposed	952	857
Measles, Mumps and Rubella (Diagnostic Serologies)	**7,278**	**8,561**
Measles (IgM positive)	4	33
Mumps (significant rise in titer)	1	0
Rubella (IgM positive)	--	21
Prenatal rubella screens	7,273	8,507
Nonreactive patients	718	666
Viral Isolation	**1,695**	**1,381**
Influenza	431	162
Enterovirus	180	162
Herpes	1,048	1,032
Rabies	**2,145**	**1,829**
Positive specimens	35	26

Environmental Testing

Chemistry		
Total samples	**5,222**	**16,468**
Blood lead samples	--	8,400
Total analyses	13,345	34,761
Blood lead ≥25 mg/dL	--	100
Bacteriology		
Water		
Private samples	**5,587**	**16,240**
Coliform positive	1,710	1,612
Public Supplies	**28,975**	**58,174**
Coliform positive	890	743
E. coli/fecal coliform positive	109	9
Swimming pools	1,260	1,848
Food/Dairy/Beverage	**3,192**	**4,989**
Excessive bacteria, coliform, yeast and mold	106	111
Significant findings:		
Pseudomonas aeruginosa (bottled water)	--	4
Salmonella brandenburg (food)	--	3
Clostridium perfringens (food)	--	1

Animal Rabies Surveillance - 1994

F. T. Satalowich, D.V.M., M.P.H.
Bureau of Veterinary Public Health

During 1994, the Department of Health laboratories located in Jefferson City, Popular Bluff and Springfield tested 1,750 animals for rabies. See Table 1. This was a 17.2 percent decrease from the number tested in 1993 and a 30 percent decrease from the norm of 2,500 per year. The number of positive cases for 1994 was 27. See Figure 1. This is the lowest number of positive rabid animals in Missouri on record. The number of positive cases has been on a decline since the epizootic of the early 80's, when almost 400 positive cases were recorded in 1981. Incidence data by species for 1994 and the preceding five years is shown in Table 2.

Table 1. Animals tested for rabies by species, Missouri, 1993 and 1994

Species	1994 No. Tested	1994 No. Positive	1993 No. Positive
Bat	157	9	21
Bovine	49	0	1
Cat	553	1	1
Dog	562	2	1
Fox	11	0	0
Horse	2	1	1
Other Domestic	18	0	0
Other Wild	93	0	0
Raccoon	159	0	0
Rodent/Lagomorph	73	0	0
Skunk	73	14	10
TOTALS	**1,750**	**27**	**35**

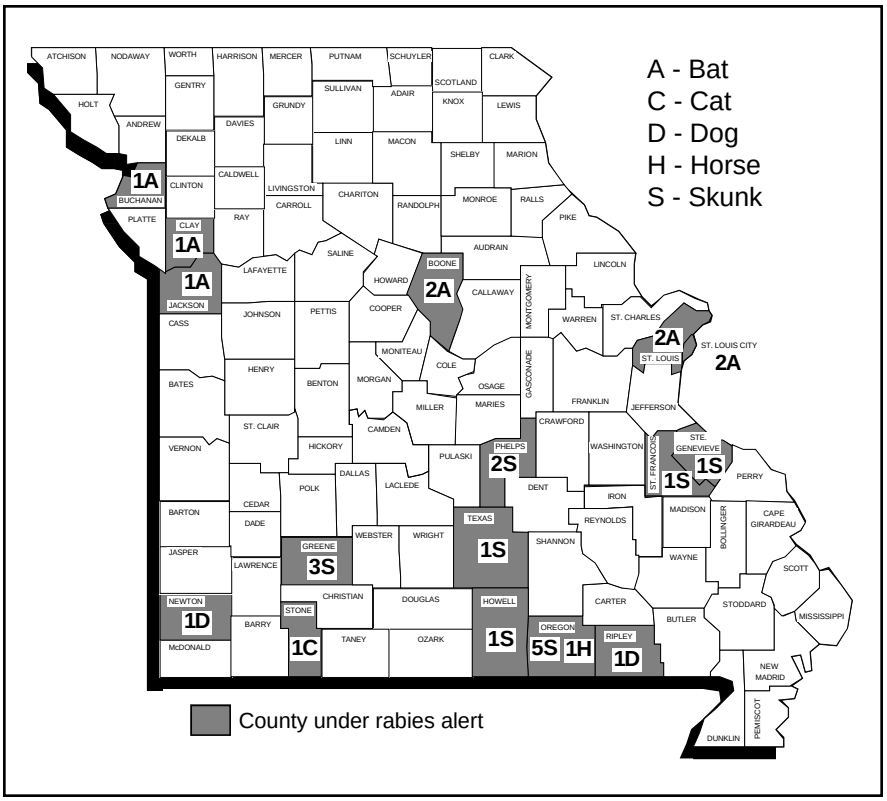

Figure 1. Positive animal rabies cases by county and species, Missouri, 1994.

Skunks

During 1994, 14 skunks, 51.8 percent of the total, were reported positive for rabies. Skunk rabies has been on the rise in Missouri since 1992 when the state recorded only six cases of skunk rabies. See Figure 2. For some unknown reason, skunk populations have been low in Missouri in recent years. However, skunk population increases have been noted over the past two years. Since skunks are the main reservoir of rabies in Missouri, it is expected that an increase in skunk populations will also result in an increase in rabies cases in skunks and in normally affected species. In 1994, the number of skunks tested for rabies was 19 percent less than the number tested in 1993.

Bats

There were nine cases of positive bat rabies in 1994; down from 21 cases in 1993. See Figure 2. Bats accounted for 60 percent of the total number of Missouri's rabies cases in 1993; they accounted for only 33.3 percent of the total number in 1994. The positive rate was 6 percent in 1994 and 8 percent in

Table 2. Incidence of animal rabies by species, Missouri, 1989–94

Species	1989	1990	1991	1992	1993	1994
Bat	22	12	15	28	21	9
Cat	1	0	0	1	1	1
Cattle	0	1	0	0	1	0
Dog	1	4	3	2	2	2
Fox	0	0	0	0	0	0
Horse	0	1	0	0	1	1
Raccoon	0	0	1	0	0	0
Skunk	38	12	9	6	10	14
TOTAL	**62**	**30**	**28**	**37**	**36**	**27**

1993. In recent years, there have been some 600–700 positive bats per year nationally. The distribution of bat rabies is well dispersed across the continental United States. Historically, it was generally accepted that bat rabies was not related to terrestrial animal and human rabies. That picture appears to be changing. Since 1980, of the 25 human cases of rabies where animal exposure could be identified and exposure occurred in the United States, 16 were of the bat rabies strain. The last eight out of ten human rabies cases were identified as the bat strain. While bats serve as a very important facet of the total ecological cycle, they are not a species to entice for close habitation with humans.

Domestic Animals

During 1994, there were four cases of domestic animal rabies, two dogs, one cat and one horse. The two positive dogs and one cat came from Newton, Stone and Ripley counties, where rabies had not been detected in wild animals. It appears that our surveillance for wildlife rabies is deficient. The positive horse came from Oregon county, where a skunk epizootic began in the late part of 1994 and continues into 1995 having spread into other neighboring southeastern counties.

Summary

Animal rabies reached an all time low in Missouri in 1994. It is known that this small number of cases is a cyclic phenomena, and that rabies is endemic in Missouri. Each animal exposure needs to be carefully examined and evaluated as to the requirement for post exposure rabies treatment. The epizootics of raccoon rabies in the mid-Atlantic states and the coyote rabies in Texas along with the cyclic skunk rabies in Missouri pose an everlasting threat of rabies in the human and domestic animal populations.

The average cost of human post exposure treatment has risen to $1,500. Since most human exposures come from contact with domestic animal species, the only cost-effective method of rabies control lies with the proper veterinary vaccination of these species, along with the control of stray animals and the limited contact with wild or stray animals.

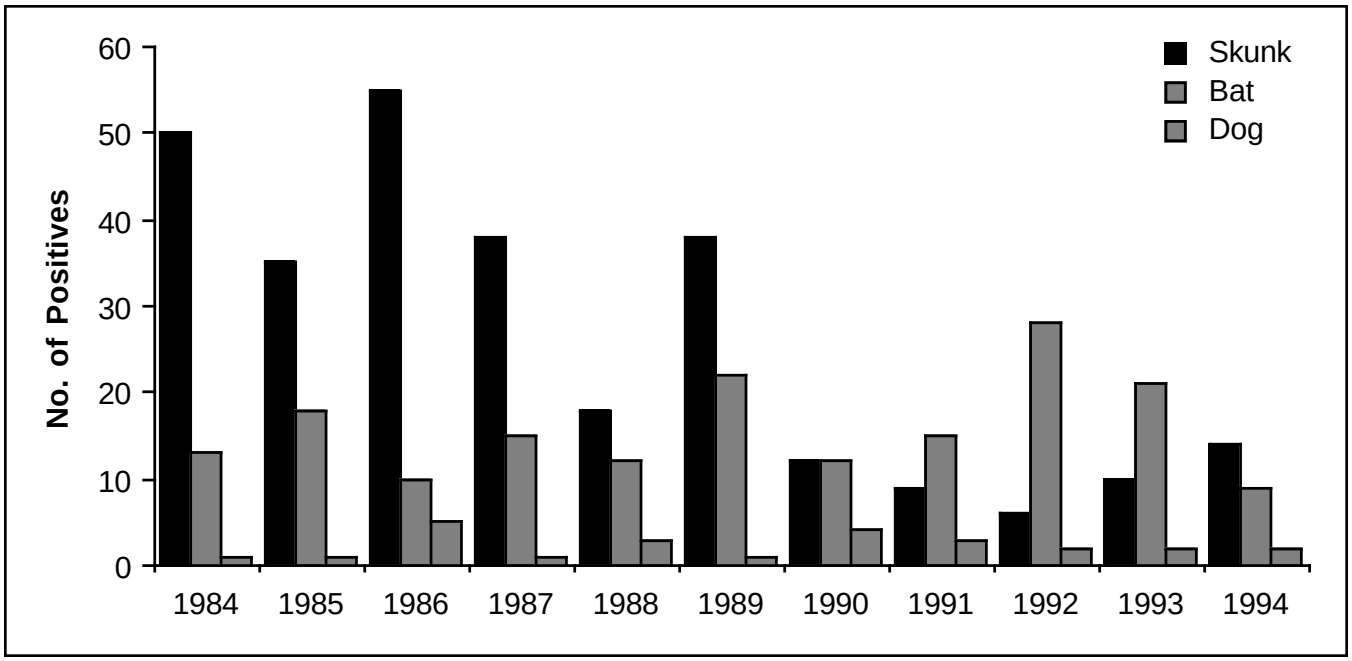

Figure 2. Positive rabies cases for skunks, bats and dogs, Missouri, 1984–94.

Bureau of Environmental Epidemiology FY 1994 Report

Gale M. Carlson, M.P.A.
Bureau of Environmental Epidemiology

The Bureau of Environmental Epidemiology is routinely involved in assessing risk to human health from hazardous substances in the environment. Requests come from private citizens, district and local health authorities, physicians, various municipal agencies, other state agencies and various federal organizations. A variety of documents discussing exposure levels, health effects, safe clean-up levels and risk from exposure to substances at hazardous waste sites throughout Missouri are produced for the Missouri Department of Natural Resources (DNR), the United States Environmental Protection Agency (EPA) and the Agency for Toxic Substances and Disease Registry (ATSDR). Epidemiologic studies are a vital tool used by the bureau.

In 1994, 51 abandoned and uncontrolled hazardous waste sites in the state were reassessed for their risks to human health. Another 11 assessments were conducted on candidate hazardous waste sites. These sites usually result from abandonment of some type of manufacturing facility. The Risk Assessment Program, in cooperation with EPA, completed one baseline risk assessment and reviewed four National Priorities List (NPL) sites within Missouri (commonly known as superfund sites). Numerous risk assessment consultations were provided to EPA and DNR on subjects ranging from the completeness of sampling plans to the adequacy of proposed plans for site clean-up. Based on the success of this program and the increasing workload which it carries, the Department of Health and EPA decided to hire an additional environmental specialist in 1995.

In cooperation with the Bureau of Health Data Analysis, two Resource Conservation and Recovery Act Health Profiles were reviewed. These are profiles of the health status of a community surrounding a proposed resource recovery facility such as battery recycling, electrical equipment refurbishing or waste incineration. Clean-up assessments (development of safe residual contaminant levels) for 15 sites in the state were also produced.

The Public Health Assessment Program, in cooperation with ATSDR, conducts public health assessments, health consultations and site review and updates on NPL sites. Public health assessments evaluate data and information on the release of hazardous substances into the environment from NPL sites and its effect on the public. Health consultations address specific requests for information about health risk from public exposures to contaminants, while site review and updates report on changes to a site since the public health assessment was completed. All of these documents are intended to inform the public of conditions involving hazardous substances and hazardous waste sites, and how the public can be protected from adverse health effects. The Public Health Assessment Program initiated or completed seven documents in 1994. Development of the documents was aided by a close working relationship with the local health departments, and in some cases, holding public availability sessions to obtain the public's input directly.

In October 1991, the Centers for Disease Control and Prevention-National Institute for Occupational Safety and Health (CDC-NIOSH) entered into a cooperative agreement with the bureau to fund a traumatic occupational fatality surveillance and intervention program called the Missouri Occupational Fatality Assessment and Control Evaluation Program (MO FACE). This program develops detailed epidemiological investigation protocols for fatalities resulting from machines, falls, electrocutions and asphyxiation deaths caused by entry into confined spaces. During 1994, the MO FACE Program collected information on 144 occupational fatalities, conducted 20 fatality investigations and worked with the companies involved in these fatalities to prevent similar incidents. Occupational fatality reports were produced for each of these investigations and disseminated to safety groups in the United States and Missouri. Figures 1–3 show a breakdown of the 144 work-related fatalities reported to MO FACE. The 1994 annual report summarizing all the activities of the MO FACE program to date was produced and disseminated. For a copy of that report, please call Thomas Ray at (800) 392-7245.

The bureau's Lead Program coordinates all lead-related programs within the Department of Health, which includes the CDC Childhood Lead Poisoning Prevention and Control Program, EPA Region VII Lead Training and Outreach Grant Programs, the Medicaid Lead Screening Program and lead in-service training for local public health agencies. It also provides technical and logistical support to the Governor's Lead Commission.

During 1994, the Childhood Lead Poisoning Prevention and Control Program expanded its environmental control capacity. Missouri enacted its lead regulations in November 1994, which require all lead inspectors/risk assessors to be trained and licensed by the Department of Health. The Lead Certification and Licensing Program is also responsible for certifying and licensing all lead training courses. There are 102 certified public health sanitarians and environmental specialists who are primarily responsible for the environmental follow-up and inspection of homes with children identified as having blood lead levels elevated above 15 micrograms per deciliter. In addition, the Department of

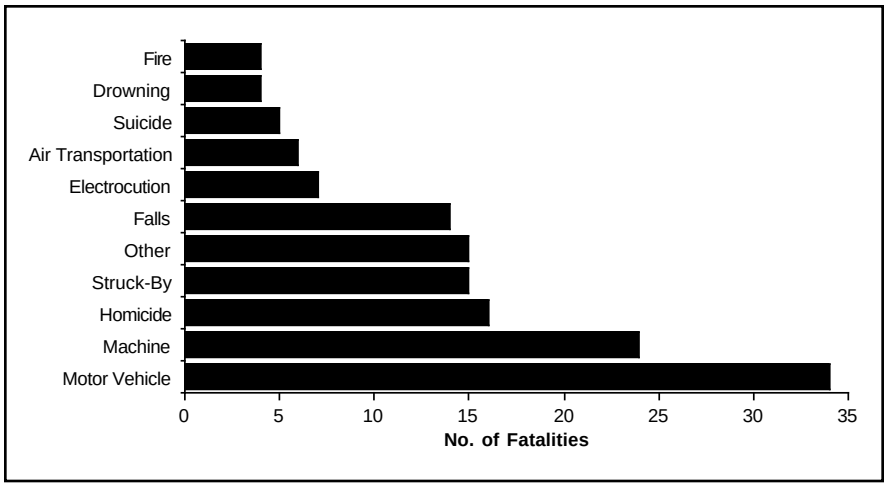

Figure 1. Occupational fatalities by cause, Missouri, 1994.

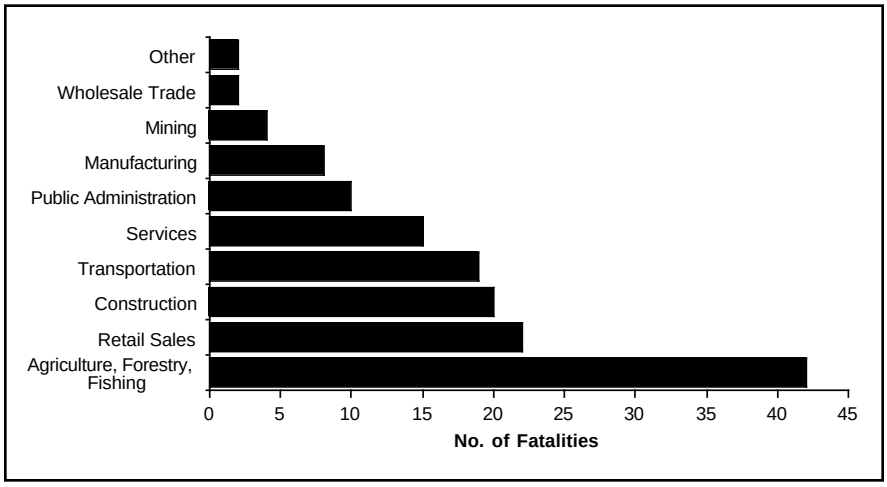

Figure 2. Occupational fatalities by industry, Missouri, 1994

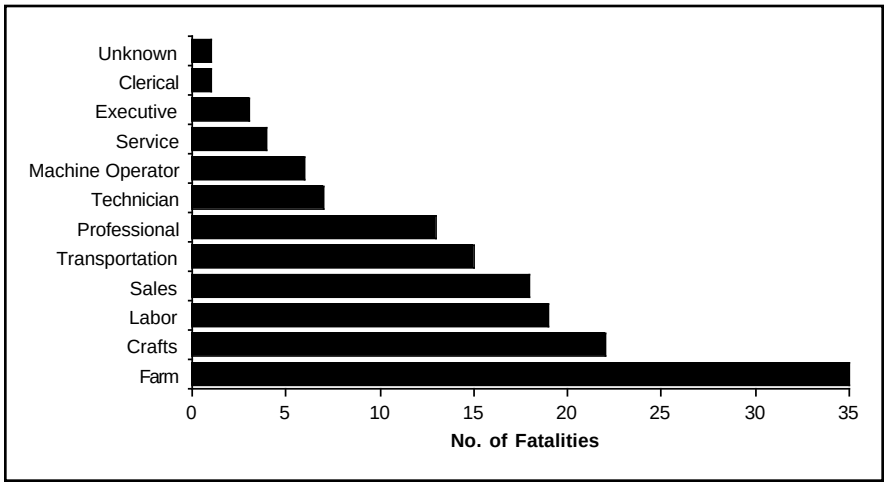

Figure 3. Occupational fatalities by occupation, Missouri, 1994.

Health hired five environmental lead specialists (including one environmental specialist funded by EPA) to serve as area coordinators in the six health districts throughout the state. See map on page 18 for location of district environmental lead specialists. The environmental lead specialist located in the Central District is also responsible for lead activities in the Eastern District.

As of December 31, 1994, there have been a total number of 19,368 children screened for lead poisoning. This includes 9,760 reported from St. Louis City, 2,354 reported from St. Louis County and 7,254 reported to the Department of Health by county health departments, physicians and laboratories in other areas of Missouri.

The funding for the Missouri Hazardous Substances Emergency Events Surveillance (HSEES) program was received in October 1993. The HSEES program monitors, collects and interprets information about hazardous substances emergencies to allow the Department of Health to better understand the public health impact of such events so that the morbidity from these events in Missouri can be reduced. During the first year of data collection (October 1, 1993–September 30, 1994), 193 events met the case definition and were investigated. The 1994 annual report for the HSEES program can be found on pages 6–8 of this issue.

The Bureau of Environmental Epidemiology maintains a passive surveillance system for environmental and occupational diseases and conditions required to be reported to the Department of Health by 19 CSR 20-20.020 and 19 CSR 20-20.080. During 1994, 4,720 cases of environmental and occupational diseases and conditions were documented, not including cases of lead poisoning in children under 6 years of age tracked by the bureau's lead program.

In April 1994, the Bureau of Radiological Health was abolished and staff from that bureau were transferred to the Bureau of Environmental Epidemiology along with responsibilities for regulating sources of ionizing radiation used in non-medical settings, emergency response and environmental radiation activities such as radon. Radiation activities in 1994 included registering or reregistering of approximately 100 facilities which use non-medical radiation sources regulated under Missouri's radiation protection law. The bureau was

(continued on page 14)

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involved in training to respond to an incident at either of the two nuclear power plants which impact Missouri (Callaway and Cooper), and participated in numerous drills and rehearsals in preparation for exercises at both. The exercise at the Cooper plant was a federally evaluated exercise and the bureau successfully met its objectives by adequately demonstrating its capability to protect the health and safety of the public. In 1994, the bureau entered into a fifth-year EPA radon grant which provided funding for radon activities concentrated in counties which have a high potential for elevated radon levels. These activities included conducting or assisting in radon surveys of 50 schools, 20 daycare centers, and numerous private residences. Eight radon awareness programs were presented to public service organizations. Approximately 1,200 phone calls were received on the radon hot-line from persons with questions about radon or requesting radon information. For more information on any aspect of radon, call Mike Tschetter or Gary McNutt at (800) 669-7236 (Radon Hotline).

The Bureau of Environmental Epidemiology issues an annual Fish Consumption Advisory. The June 1994 advisory emphasized that carp and catfish in many water bodies in the state are still contaminated with chlordane and other pesticides at a level of health concern. The advisory also emphasized the types of fish that were safe to eat and stressed the benefits of eating fish as a good, healthy protein source. For copies of the latest advisory, call Gale Carlson at (800) 392-7245.

A major portion of the bureau's resources are expended in special studies designed to determine exposure of Missouri residents to hazardous substances. In 1994, four studies were underway. These studies were:

- In September 1994, the bureau received funding from ATSDR to investigate lead exposure in children between the ages of 6–72 months living in the area around the Big River Mine Tailings Site in St. Francois County. This study investigates potential exposures to lead from mine and mill wastes in the area. Field work on this study began in April 1995 and is continuing during the summer of 1995.
- The bureau anticipated receiving funding to study the exposure of area residents to emissions from the dioxin incinerator in Times Beach, Missouri. In preparation for this investigation, a door-to-door census of the study and control areas was conducted in late November and early December of 1994. Sampling and data collection will begin in late summer or early fall of 1995.
- In April 1994, the Department of Health awarded a contract to Washington University School of Medicine to investigate the mold contamination in buildings affected by the 1993 floods in eastern, central and western Missouri and to examine the effect of mold exposure on the health of occupants. A final report for this study will be submitted to the bureau in the fall of 1995.
- From the middle of May 1994 through the end of 1994, the bureau conducted an active surveillance program to locate individuals throughout the state who were experiencing allergic reactions to molds caused by flooding in 1993 or 1994. A final report on this program is being prepared and will be sent to interested parties in the summer of 1995.

Summaries of these studies will be published in future issues of the *Missouri Epidemiologist*. Complete copies of the study reports will be available upon request from the Bureau of Environmental Epidemiology at (800) 392-7245.

Outbreaks of Communicable Disease in 1994

(continued from page 5)
Seventeen of these scabies outbreaks occurred in nursing homes, and one occurred in a sheltered workshop. In all instances, transmission of the mite was from person-to-person.

Six outbreaks of acute respiratory illness of unknown etiology (ARI) were reported involving a total of 304 people. Five deaths were associated with two of these outbreaks. All of these outbreaks occurred in nursing homes and the mode of transmission was person-to-person.

Outbreaks of acute gastrointestinal illness of unknown etiology (AGI) occurred in four nursing homes. An additional community outbreak involved workers in a long-term-care facility. A total of 306 persons were affected. The mode of transmission in each instance was person-to-person.

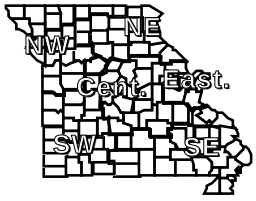
Three outbreaks of staphylococcal infection were reported, affecting a total of 28 people. Two of these outbreaks occurred in nursing homes; the other took place in a hospital. All outbreaks involved methicillan-resistant *Staphylococcus aureus*.

Three outbreaks of *Salmonella* were reported and involved 41 people. Two of the outbreaks were in a hospital and one was in a nursing home. One of the hospital outbreaks was foodborne, the remainder were person-to-person.

There were three outbreaks of pediculosis involving 103 people in nursing homes.

There were two outbreaks of Group A *Streptococcus* in nursing homes involving 17 people. Necrotizing fasciitis was the presenting characteristic in 3 of 11 people in one outbreak.

One outbreak of confirmed influenza involving 60 people was reported in a nursing home. Two outbreaks of influenza-like illness, encompassing 32 cases, were also reported in two nursing homes.



Missouri Department of Health
Division of Environmental Health and Epidemiology
BIMONTHLY MORBIDITY REPORT

Reporting Period *
January - February, 1995

	Districts							KANSAS CITY	ST. LOUIS CITY	ST. LOUIS CO.	SPGFLD GREENE CO.	2 MONTH STATE TOTALS		CUMULATIVE		
	** NW	NE	CD	SE	** SW	** ED	*** OTHER					1995	1994	FOR 1995	FOR 1994	5 YR MEDIAN
Vaccine Preventable Dis.																
Chickenpox	445	210	437	347	306	115		0	0	1	11	1872	2425	1872	2425	2255
Diphtheria	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Hib Meningitis	0	1	0	0	0	0		1	0	0	0	2	3	2	3	5
Hib Other Invasive	0	0	2	0	0	0		1	0	0	0	3	8	3	8	4
Influenza	3	1	3	1	1	13		17	3	27	0	69	152	69	152	116
Measles	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Mumps	0	0	0	1	0	4		0	1	0	0	6	4	6	4	5
Pertussis	0	0	2	0	1	0		0	0	0	0	3	6	3	6	8
Polio	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Rubella	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Tetanus	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Viral Hepatitis																
A	25	0	4	0	4	18		7	27	21	0	106	82	106	82	106
B	7	0	0	1	5	2		7	36	2	3	63	64	63	64	89
Non A - Non B	2	0	0	2	0	1		0	0	1	0	6	2	6	2	6
Unspecified	0	0	0	0	0	0		0	0	0	0	0	0	0	0	1
Meningitis																
Aseptic	1	0	1	0	0	0		1	0	4	2	9	19	9	19	19
Meningococcal	1	1	1	0	0	3		0	1	0	0	7	18	7	18	8
Enteric Infections																
Campylobacter	6	1	1	3	10	6		1	1	11	2	42	39	42	39	44
Salmonella	17	1	2	4	3	3		8	7	12	1	58	50	58	50	50
Shigella	27	2	18	2	0	5		38	10	17	2	121	41	121	41	41
Typhoid Fever	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Parasitic Infections																
Amebiasis	0	0	0	0	0	0		0	1	0	0	1	4	1	4	4
Giardiasis	10	2	10	12	4	9		5	4	10	7	73	73	73	73	78
Sexually Transmitted Dis.																
AIDS	9	0	2	1	1	2	6	29	23	7	0	80	121	80	121	104
Gonorrhea	61	16	56	57	49	17		513	764	322		1855	1449	1855	1449	2503
Genital Herpes	37	15	49	30	63	37		107	158	99		595	507	595	507	541
Nongonoc. urethritis	21	7	17	29	10	11		229	656	199	16	1195	935	1195	935	935
Prim. & Sec. syphilis	1	1	0	0	1	3		4	67	42	1	120	179	120	179	158
Tuberculosis																
Extrapulmonary	0	0	0	2	0	0	0	1	0	1	0	4	2	4	2	3
Pulmonary	0	0	0	0	1	1	1	3	0	5	0	11	20	11	20	20
Zoonotic																
Animal Bites	69	18	33	103	84	28		0	0	266	18	619	650	619	650	650
Psittacosis	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Rabies (Animal)	0	0	0	6	1	0		0	0	0	0	7	2	7	2	2
Rocky Mtn. Sp. Fever	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Tularemia	0	0	0	0	0	0		0	0	0	0	0	1	0	1	2

TEAR OUT FOR FUTURE REFERENCE

Low Frequency Diseases

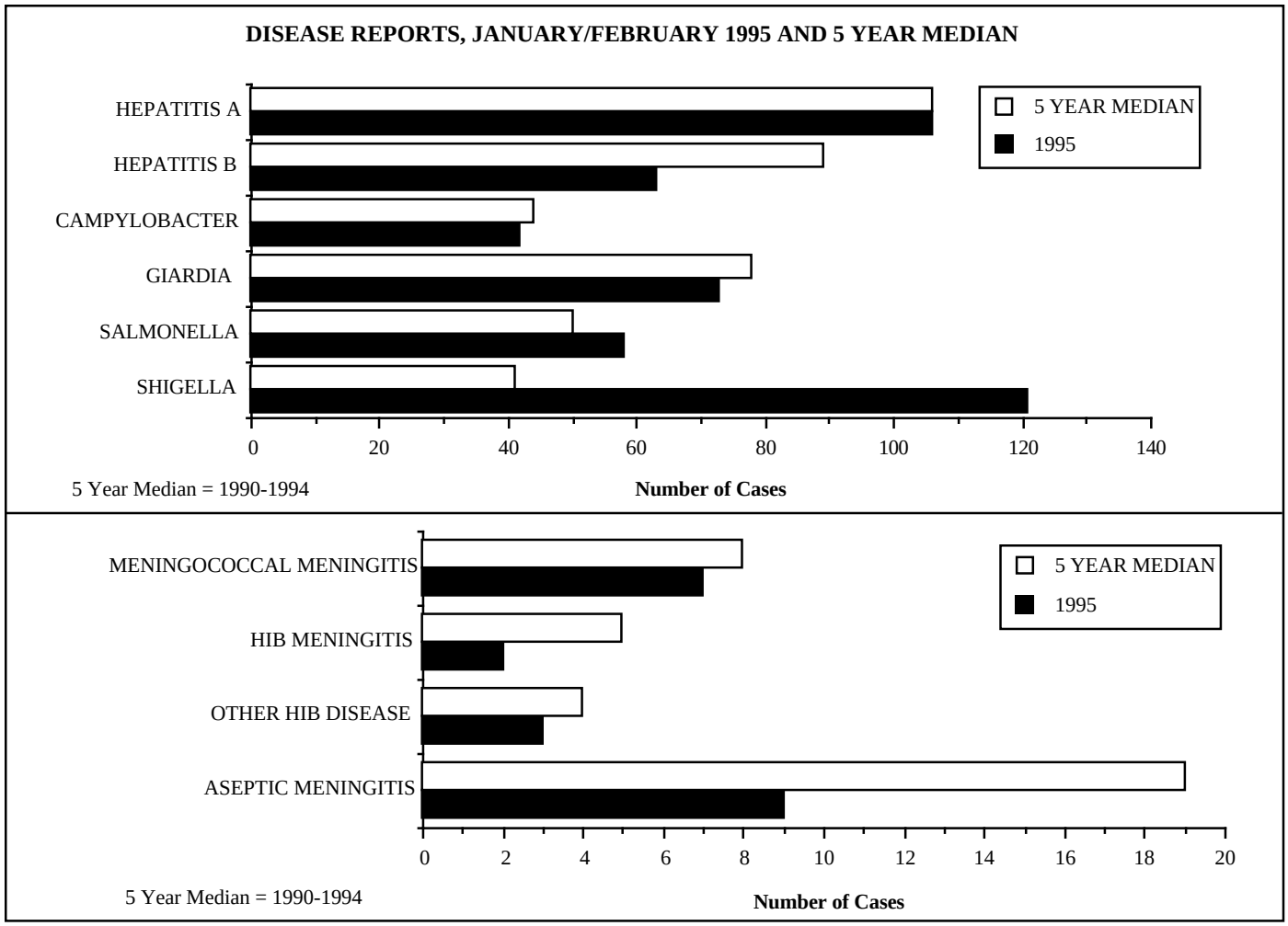
Anthrax
Botulism
Brucellosis
Chancroid
Cholera
Cryptosporidiosis
Encephalitis (infectious)
Encephalitis (viral/arbo-viral)
Granuloma Inguinale
Kawasaki Disease - 3
Legionellosis - 14
Leptospirosis - 2
Lymphogranuloma Venereum
Malaria - 1
Plague
Rabies (human)
Reye's Syndrome
Rheumatic fever, acute
Toxic Shock Syndrome - 3
Trichinosis

Outbreaks

Foodborne - 1
Waterborne
Nosocomial - 2
Pediculosis
Scabies - 1
Other
Campylobacter - 1
AGI - 1
Shigella - 1

*Reporting Period Beginning January 1, Ending February 25, 1995.
**Totals do not include KC, SLC, SLCo, or Springfield
***State and Federal Institutions

Due to data editing, totals may change.



VIRAL HEPATITIS

During the January/February bimonthly period, the number of hepatitis A cases rose by 29.3%, from 82 cases during January/February 1994 to 106 cases during January/February 1995. The number of cases for the 1995 bimonthly period is the same as the five year bimonthly median for hepatitis A. Hepatitis B cases decreased by one case for the bimonthly period, from 64 in 1994 to 63 in 1995, and is 29.2% below the five year bimonthly median of 89 cases for January/February.

ENTERICS

Campylobacter increased by 7.7% from 1994 to 1995. It changed from 39 cases to 42 cases during the January/February bimonthly time period. It decreased by 4.5% from the five year median of 44 cases. Salmonella, at 58 cases, has risen 16.0% from 50 cases in 1994. The five year median is also 50 cases. Shigellosis again increased dramatically. It increased by 195.1% from 41 cases in 1994 to 121 cases in 1995 during the period. The five year median is 41 cases.

PARASITES

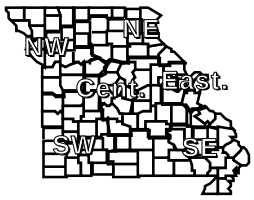
There was no change from 1994 to 1995 for giardiasis during the period. There were 73 cases reported for both periods. This is 6.4% below the five year median of 78 cases.

MENINGITIS

Aseptic meningitis decreased by 52.6% to 9 cases in 1995 from 19 cases in 1994. The five year median is 19 cases. Meningococcal meningitis fell by 61.1% from 18 cases in 1994 to 7 cases in 1995. It decreased 12.5% from the five year median of 8 cases.

HIB DISEASE

Hib meningitis was reported at 2 cases for the period in 1995 and 3 cases in 1994. It is a decrease of 60.0% from the five year median of 5 cases. Other invasive Hib disease decreased by 62.5%, from 8 cases in 1994 to 3 cases in 1995. Other invasive Hib disease was made reportable in 1990 and there is now a January/February bimonthly five year median for other invasive Hib disease. It is 25.0% below the bimonthly five year median of 4 cases.



Missouri Department of Health
Division of Environmental Health and Epidemiology
BIMONTHLY MORBIDITY REPORT

Reporting Period *
March - April, 1995

	Districts							KANSAS CITY	ST. LOUIS CITY	ST. LOUIS CO.	SPGFLD GREENE CO.	2 MONTH STATE TOTALS		CUMULATIVE		
	** NW	NE	CD	SE	** SW	** ED	*** OTHER					1995	1994	FOR 1995	FOR 1994	5 YR MEDIAN
Vaccine Preventable Dis.																
Chickenpox	824	296	409	471	317	7		0	0	0	9	2333	3303	4205	5728	5531
Diphtheria	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Hib Meningitis	0	0	0	0	0	0		0	0	1	0	1	0	3	3	7
Hib Other Invasive	1	0	2	0	1	0		0	0	0	0	4	13	6	21	21
Influenza	3	9	23	7	4	38		16	7	121	4	232	11	301	163	163
Measles	0	0	0	0	0	0		0	0	0	0	0	42	0	42	1
Mumps	0	0	0	2	0	0		0	0	2	0	4	8	10	12	15
Pertussis	0	0	1	0	0	0		0	1	0	0	2	5	5	11	14
Polio	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Rubella	0	0	0	0	0	0		0	0	0	0	0	0	0	0	1
Tetanus	0	0	0	0	1	0		0	0	0	0	1	0	1	0	0
Viral Hepatitis																
A	84	1	30	1	5	4		25	14	15	2	181	74	287	156	201
B	7	1	5	1	12	4		6	25	5	3	69	94	134	158	177
Non A - Non B	5	0	1	1	0	1		1	1	5	0	15	2	21	4	13
Unspecified	0	0	0	0	0	0		0	0	0	0	0	0	0	0	3
Meningitis																
Aseptic	1	1	0	1	3	0		2	0	1	1	10	20	19	39	30
Meningococcal	3	1	1	0	2	1		1	0	1	1	11	9	18	27	19
Enteric Infections																
Campylobacter	6	2	9	10	3	4		2	2	16	4	58	86	99	125	116
Salmonella	5	1	5	3	3	1		9	1	8	2	38	59	95	109	109
Shigella	35	1	20	3	0	5		19	3	8	1	95	83	217	124	124
Typhoid Fever	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Parasitic Infections																
Amebiasis	0	0	0	0	0	0		0	0	0	0	0	7	1	11	7
Giardiasis	7	0	8	10	6	4		3	4	16	12	70	80	147	153	166
Sexually Transmitted Dis.																
AIDS	11	2	5	7	2	3	4	35	34	22	2	127	142	207	263	218
Gonorrhea	45	13	83	51	37	15		517	1031	398		2190	2245	4045	3694	4588
Genital Herpes	26	25	42	33	71	38		101	102	121		559	652	1154	1159	1136
Nongonoc. urethritis	12	8	19	23	8	7		279	600	358	10	1324	1103	2519	2038	2106
Prim. & Sec. syphilis	0	0	0	1	1	0		4	61	34	0	101	189	221	368	313
Tuberculosis																
Extrapulmonary	1	0	0	1	1	2	0	1	2	0	0	8	9	12	11	11
Pulmonary	5	4	4	10	1	2	0	6	6	7	0	45	37	56	57	59
Zoonotic																
Animal Bites	190	49	71	198	169	54		0	1	421	33	1186	1162	1805	1812	1736
Psittacosis	0	0	0	0	0	0		0	0	0	0	0	1	0	1	0
Rabies (Animal)	0	0	1	4	0	0		0	0	0	0	5	4	12	6	6
Rocky Mtn. Sp. Fever	0	0	0	0	1	0		0	0	0	0	1	0	1	0	1
Tularemia	0	0	0	0	1	0		0	0	0	0	1	1	1	2	3

Low Frequency Diseases

Anthrax
Botulism
Brucellosis
Chancroid
Cholera
Cryptosporidiosis
Encephalitis (infectious)
Encephalitis (viral/arbo-viral)
Granuloma Inguinale
Kawasaki Disease - 3
Legionellosis - 14
Leptospirosis - 1
Lymphogranuloma Venereum
Malaria - 1
Plague
Rabies (human)
Reye's Syndrome
Rheumatic fever, acute
Toxic Shock Syndrome - 4
Trichinosis

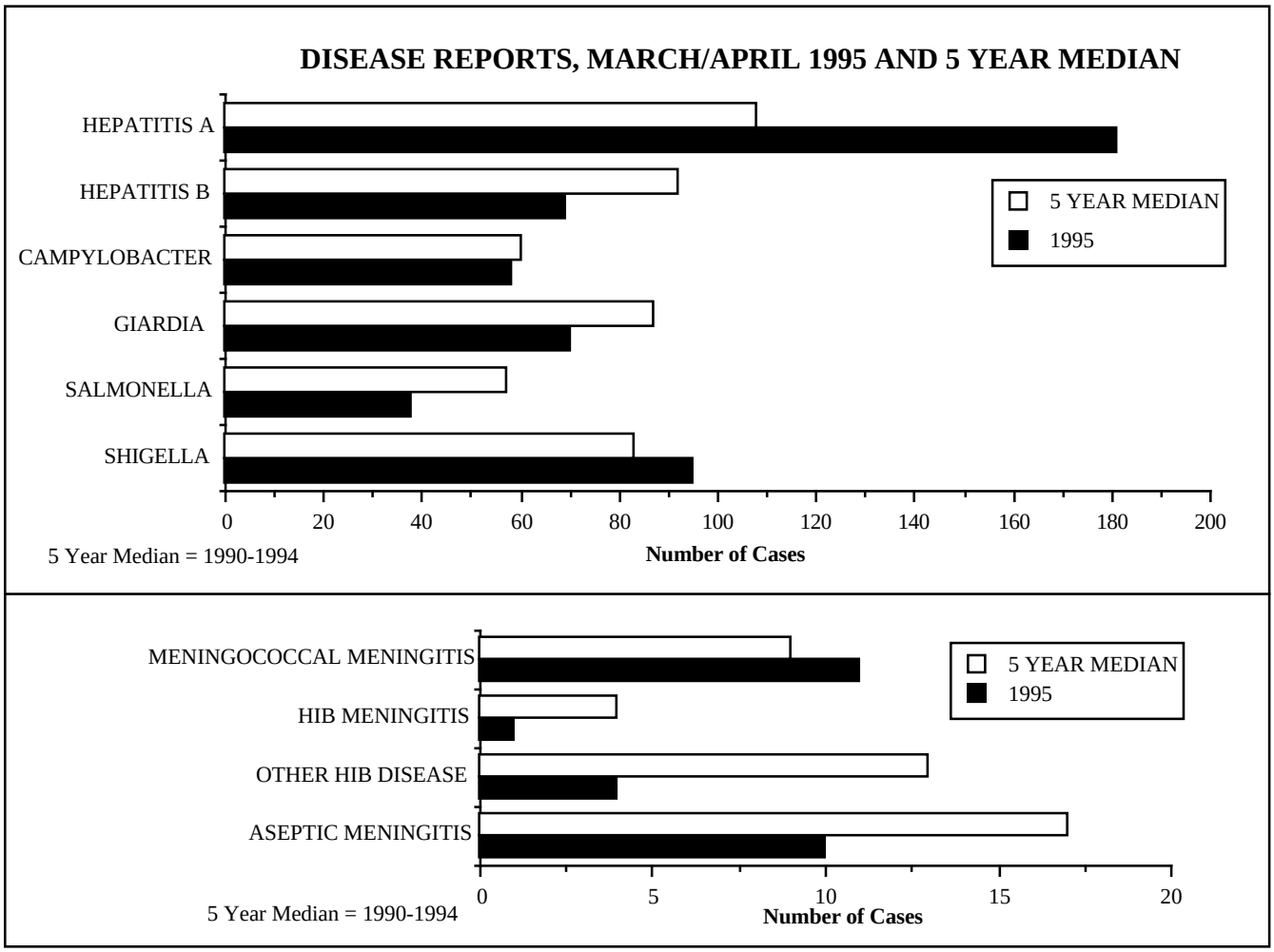
Outbreaks

Foodborne - 5
Waterborne
Nosocomial - 4
Pediculosis
Scabies
Other
Hepatitis A - 2
Legionellosis - 1
Esophagitis - 1

*Reporting Period Beginning February 26, Ending April 29, 1995.
**Totals do not include KC, SLC, SLCo, or Springfield
***State and Federal Institutions

Due to data editing, totals may change.

TEAR OUT FOR FUTURE REFERENCE



VIRAL HEPATITIS

Continuing a trend observed in the January/February 1995 bimonthly period, the March/April 1995 bimonthly period also showed an increase, of 144.6%, in the number of hepatitis A cases, from 74 cases during March/April 1994 to 181 cases during March/April 1995. This is 67.6% above the five year bimonthly median of 108 cases of Hepatitis A. Hepatitis B cases fell dramatically by 26.6% for the bimonthly period, from 94 in 1994 to 69 in 1995. Hepatitis B is 25.0% below the five year bimonthly median for March/April of 92 cases.

ENTERICS

Campylobacter underwent a large decrease from 1994 to 1995. It fell 32.6% from 86 cases to 58 cases during the March/April bimonthly time period. It decreased by 3.3% from the five year median of 60 cases. Salmonella, at 38 cases, has fallen 35.6% from 59 cases in 1994. This is 33.3% below the five year median of 57 cases. Shigellosis increased by 14.5% from 83 cases in 1994 to 95 cases in 1995. The five year median is 83 cases.

PARASITES

Giardiasis fell by 12.5% from 80 cases during the 1994 bimonthly period to 70 in 1995. This is 19.5% below the five year median of 87 cases.

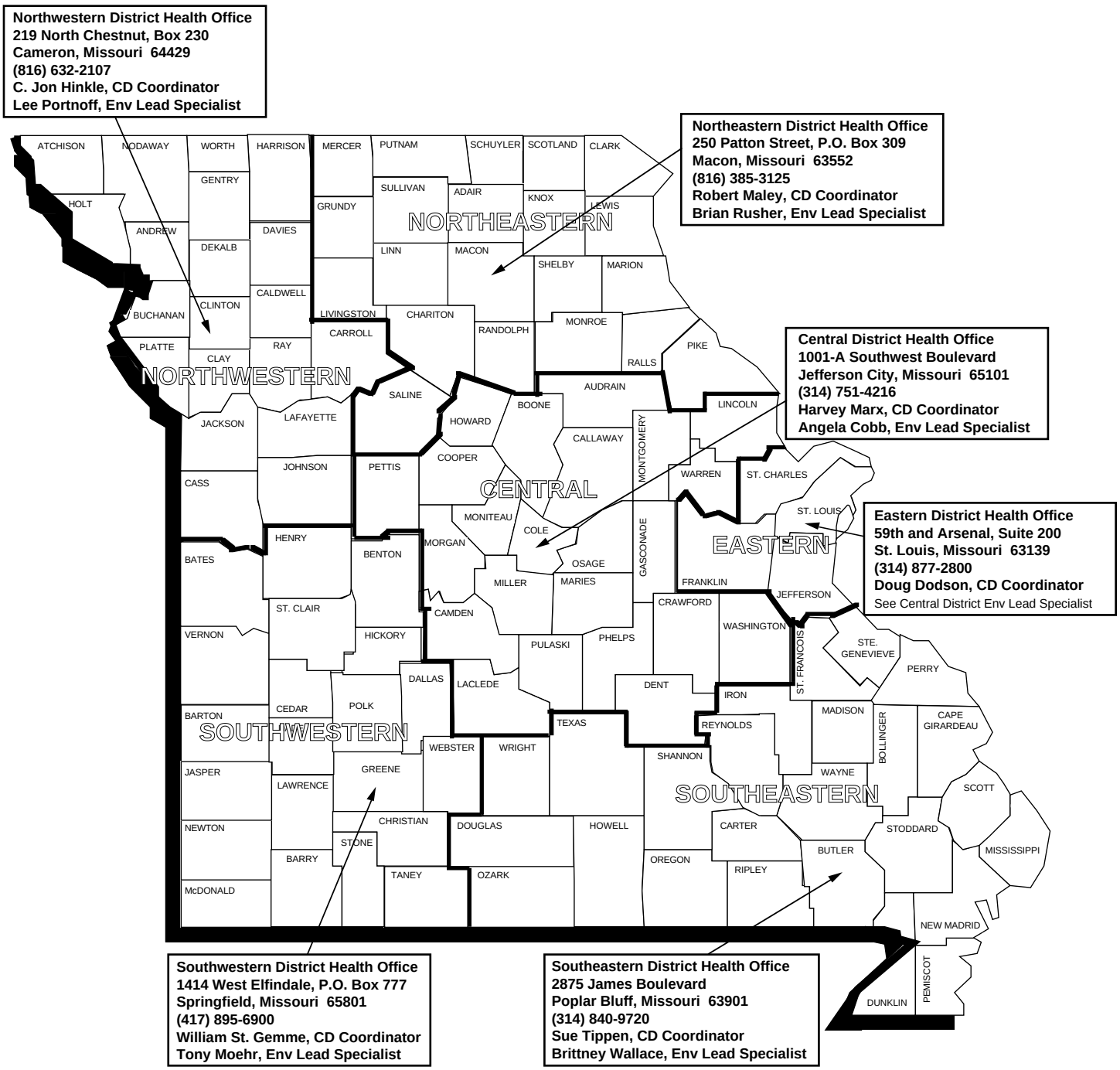
MENINGITIS

Aseptic meningitis decreased by 50.0% from 20 cases in 1994 to 10 cases in the 1994 bimonthly time period. This is 41.2% below the five year median of 17 cases. Meningococcal meningitis rose by 22.2% from 9 cases in 1994 to 11 cases in 1995. There are nine cases in the five year median.

HIB DISEASE

One case of Hib meningitis was reported for the period in 1995 and none in 1994. It is a decrease of 75.0% from the five year median of 4 cases. Other invasive Hib disease decreased by 69.2%, from 13 cases in 1994 to 4 cases in 1995. Other invasive Hib disease was made reportable in 1990 and there is now a March/April bimonthly five year median for other invasive Hib disease. There are 13 cases in the bimonthly five year median.

Missouri Department of Health



This map depicts the division of counties into Department of Health districts and gives the names of the Communicable Disease (CD) Coordinators and Environmental (Env) Lead Specialists for those districts.

Missouri Morbidity and Mortality Reports of Selected Communicable Diseases - 15 Year Report

	1994	1993	1992	1991	1990	1989	1988	1987	1986	1985	1984	1983	1982	1981	1980
AIDS	729	1664	662	656	599	481	403	239	91	52	28	6	1	-	-
Amebiasis	38	54	23	25	26	19	30	27	26	28	44	45	11	28	15
Brucellosis	0	0	0	3	1	2	4	14	4	12	7	4	4	4	3
Campylobacter	631	616	614	602	547	473	441	260	281	304	260	166	115	78	49
Chickenpox	10147	9609	10009	7678	10591	9086	11350	8595	5093	2474	2565	408	637	880	2331
Chlamydia	12244	11625	11907	10643	11151	8151	6239	2944	1532	412	9	-	-	-	-
Encephalitis, Inf.	14	26	16	22	12	6	8	11	13	12	11	28	16	10	13
Giardiasis	774	770	739	790	878	859	654	690	516	458	462	216	235	113	77
Gonorrhea	12555	13147	14887	17450	20012	21053	17241	16491	19029	20023	20042	20750	21269	22249	21640
Haemophilus influenzae type B															
Meningitis	7	12	22	42	88	106	138	131	172	108	104	86	66	-	-
Other Invasive	44	123	59	39	57	-	-	-	-	-	-	-	-	-	-
Hepatitis A	619	1443	1500	653	619	810	897	560	126	98	138	123	204	282	254
Hepatitis B	538	585	535	549	633	704	639	460	420	359	297	365	297	307	205
Non A, Non B	32	25	27	31	42	53	50	46	39	42	18	33	24	(Added to Hepatitis Unspec.)	
Unspecified	1	19	9	15	19	13	21	21	15	24	46	87	95	214	176
Influenza (confirmed)	163	272	111	462	220	293	148	69	78	61	39	140	153	225	-
Lyme Disease	102	108	150	207	205	108	-	-	-	-	-	-	-	-	-
Malaria	14	9	12	9	13	13	6	8	12	5	8	4	10	4	16
Meningitis, Asep.	175	275	272	277	246	223	124	163	172	156	95	277	156	178	116
Meningitis, Mening.	43	34	32	37	31	21	33	35	40	46	53	55	40	45	42
Meningitis, Other	52	78	43	62	66	64	64	75	123	47	51	276	156	122	127
Mumps	44	46	39	40	62	87	68	38	23	18	11	21	13	40	103
Pertussis	45	144	120	83	116	141	25	46	32	35	23	24	17	24	30
Polio, all forms	0	0	0	0	0	0	1	0	0	1	0	2	0	1	0
Rabies, Animal	27	35	37	28	30	62	36	59	75	59	70	96	123	243	379
RMSF	22	20	24	25	36	48	54	26	25	10	14	14	10	23	31
Rubella	2	1	1	5	3	4	0	0	1	7	0	0	38	2	45
Rubeola	161	1	0	1	103	671	65	190	32	5	6	1	2	1	67
Salmonellosis	642	529	426	616	723	676	772	660	728	690	617	602	571	700	589
Shigellosis	654	674	742	259	284	411	607	471	89	143	244	264	67	268	129
Syphilis, Total	1985	2499	1940	926	598	388	473	328	494	578	712	801	1069	1397	1051
Primary & Second.	987	1354	1167	572	272	162	154	90	110	133	186	145	296	394	163
Tetanus	1	1	1	1	0	4	1	1	2	3	6	1	1	1	2
Tuberculosis	260	256	245	254	312	278	275	339	338	311	354	399	390	432	466
Tularemia	24	17	34	44	33	39	45	58	32	35	40	51	27	28	26
Typhoid Fever	1	2	3	2	4	2	3	7	6	6	6	10	4	9	20
Yersinia enterocolitica	40	26	37	48	32	36	30	10	6	2	3	1	-	-	-

Vaccine-Preventable Disease 1994 Annual Report

Mary Ann Harder, M.S.
Bureau of Immunization

Forty-five cases of pertussis (whooping cough) were reported in 1994. This is the lowest number of cases reported during the past five years. See Figure 1. Of the reported cases in 1994, 26 (58%) occurred among infants 6 months of age or younger, with one death in a 1-month-old infant. This infant probably contracted the disease from an adult who also had the disease. Pertussis is highly communicable.

In 1994, 161 cases of measles (rubeola) were reported in Missouri. This is the highest number of cases reported in the past five years. See Figure 1. However, of the 161 cases, 156 were related to an outbreak at a Christian Science prep school in the St. Louis area, whose students customarily claim a religious exemption to immunization. There was no spread from this outbreak to any adequately immunized individual. The five remaining reported cases of measles were unrelated, isolated, and the sources unknown. See Figure 2.

During 1994, only two cases of rubella were reported. Since 1990, a total of nine cases of rubella have been reported. See Figure 1. Of the two cases of rubella reported during 1994, one case was in a 21-year-old woman and the other was a 32-year-old woman. The cases were isolated and unrelated. Prevention of congenital rubella syndrome is the main objective of rubella vaccination programs in the United States.

One case of tetanus was reported in 1994. This occurred in a 35-year-old woman in the southwestern part of the state, who sustained a wound of less than one centimeter in depth while working in the garden. Her immunization history was unknown. The diagnosis of tetanus is entirely clinical. There are no characteristic laboratory findings.

The only way to prevent the diseases mentioned above, as well as invasive

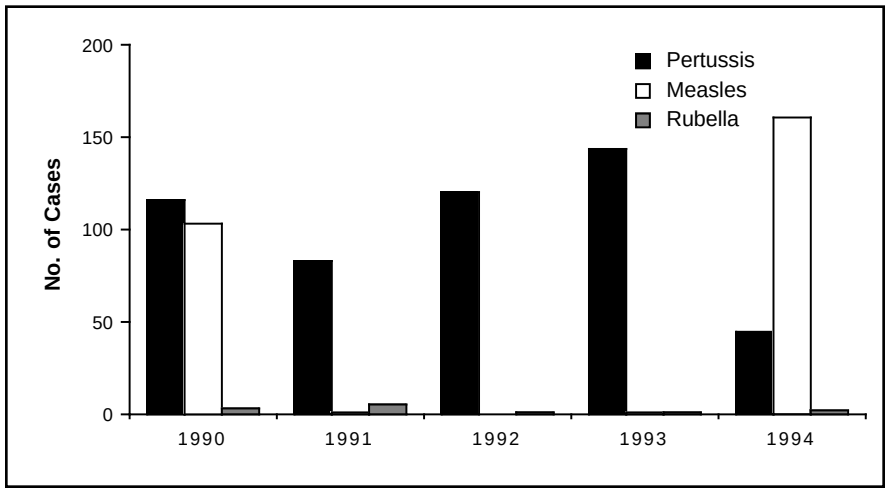
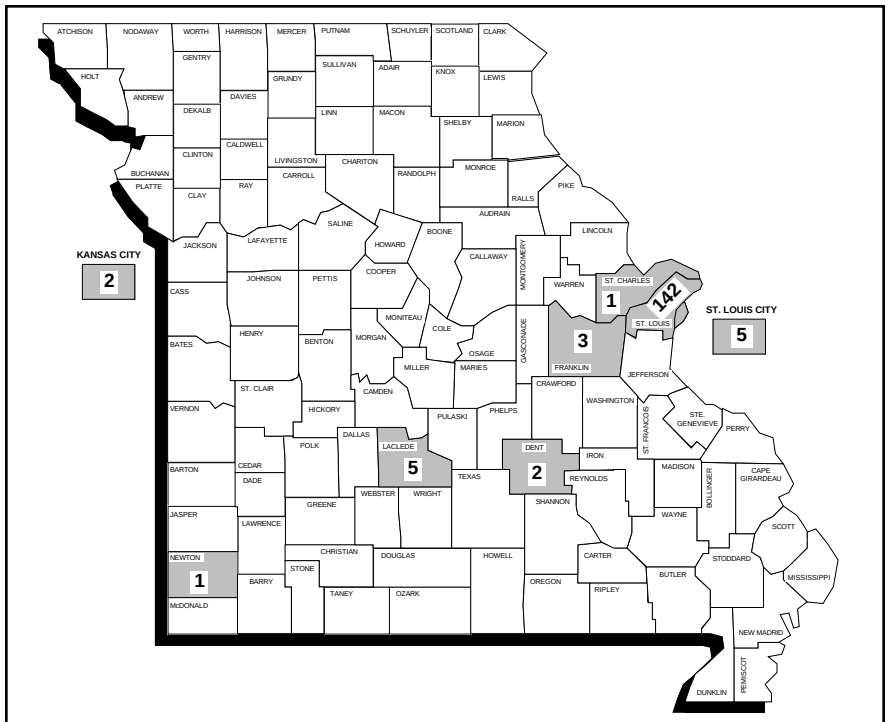


Figure 1. Reported cases of pertussis, measles and rubella by year, Missouri, 1990-94.



Christian Science Outbreak

St. Louis Couty	142
St. Louis City	5
Franklin County	3
St. Charles County	1
Laclede County	5
Total	**156**

Other Measles Cases

Kansas City	2
Newton County	1
Dent County	2
Total	**5**

Figure 2. Measles cases by county, Missouri, 1994.

Haemophilus influenzae type b infections, is to maintain high levels of immunization. Results of the 1994 immunization survey indicate that only 66 percent of Missouri's two-year-olds are age-appropriately immunized. While this is an increase of fourteen percent over

(continued on page 27)

Sexually Transmitted Diseases and HIV - 1994

Beth Meyerson, M.Div.
Bureau of STD/HIV Prevention

Robert H. Hamm, M.D., M.P.H.
Office of Epidemiology

The mission of the Bureau of STD/HIV Prevention is to prevent the infection, re-infection and transmission of STDs and HIV throughout Missouri through education, intervention and surveillance. The bureau strives to meet its mission through dynamic partnerships with local health departments, community-based organizations, government agencies, private businesses and concerned individuals. These partnerships are developed through community planning organizations throughout the state. See Figure 1.

The Bureau of STD/HIV Prevention provides assistance to local health departments and community organizations which prevent STDs and HIV in their communities. Services include:

- Prevention programming and technical assistance
- Testing and surveillance of disease and infection See Figure 2.
- Disease intervention and treatment See Figure 3.

AIDS is the national leading cause of death for persons 25–44 years of age; Missouri is 16th in the nation for rate of HIV infection and 4th for syphilis and gonorrhea rates. St. Louis, Missouri leads the country in syphilis and gonorrhea morbidity.

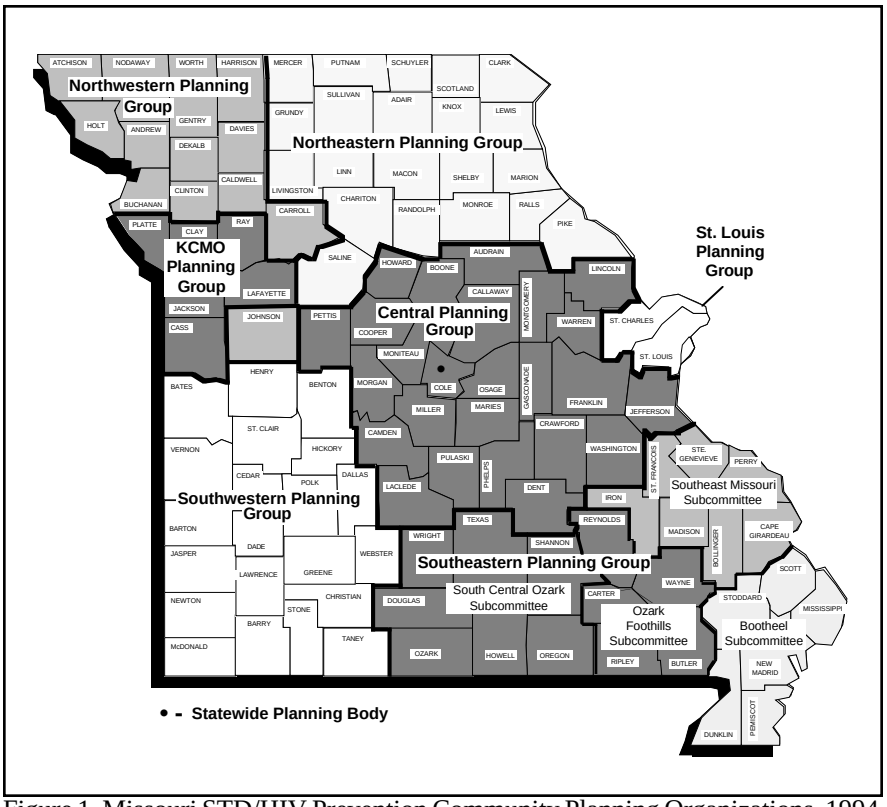


Figure 1. Missouri STD/HIV Prevention Community Planning Organizations, 1994.

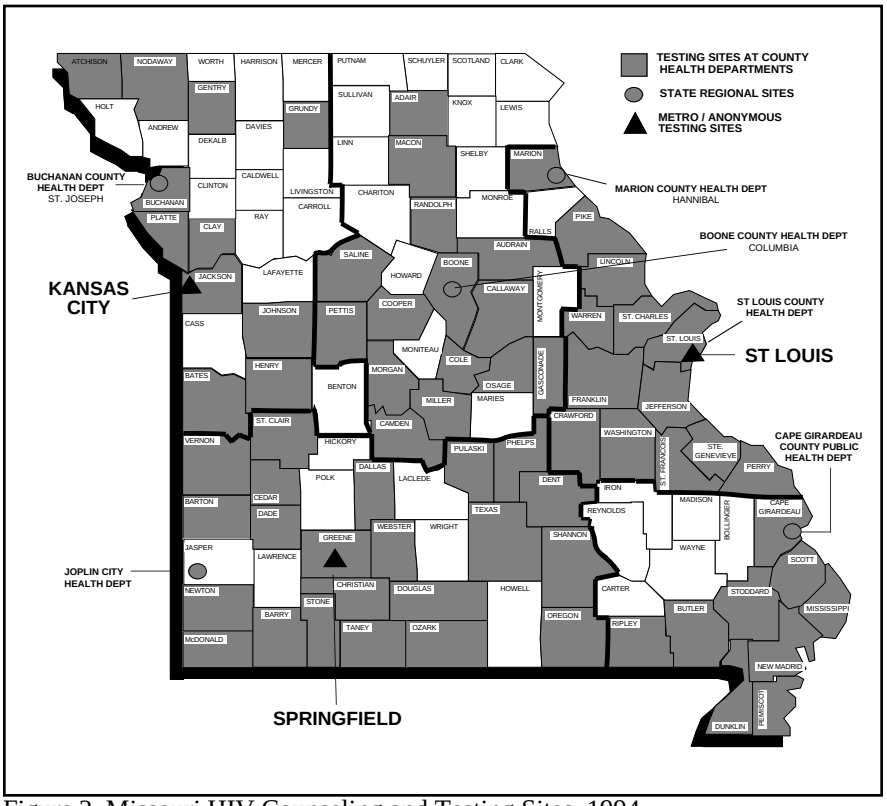


Figure 2. Missouri HIV Counseling and Testing Sites, 1994.

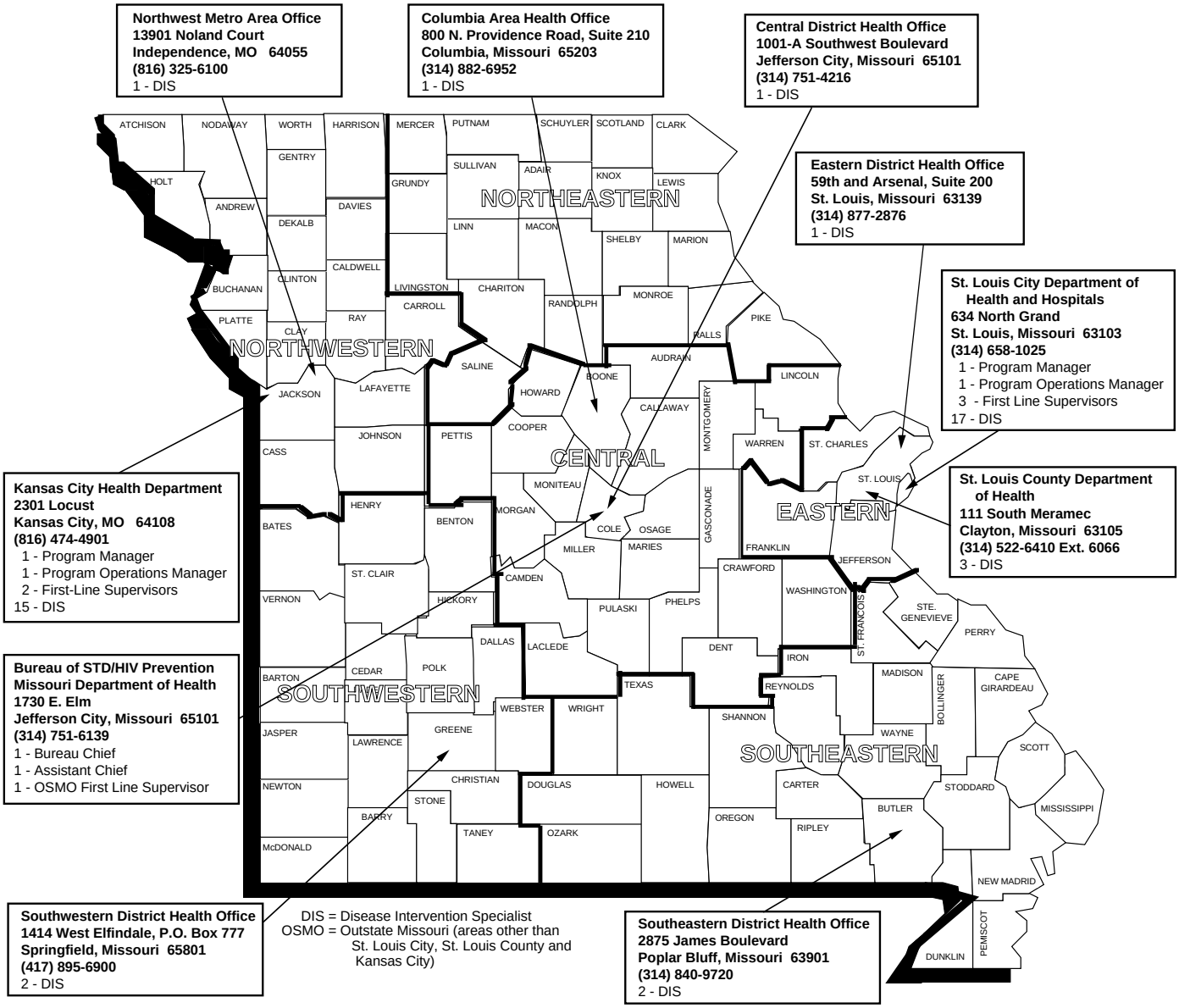
Early Syphilis

Primary, Secondary and Early Latent of less than one year's duration

The reported incidence of early syphilis in Missouri increased in 1993 compared to 1992. A decrease in incidence was noted in 1994. Primary and secondary

(continued on page 24)

Missouri Department of Health
Bureau of STD/HIV Prevention



This map depicts the division of counties into Department of Health districts and gives the location of STD/HIV intervention and treatment staff. Feel free to contact the Disease Intervention Specialist (DIS) in your area regarding STD/HIV concerns.

Figure 3. Missouri Bureau of STD/HIV Prevention staff by area office, February 1995.

(continued from page 22)
cases decreased by 27 percent from 1,354 in 1993 to 987 in 1994. Early latent cases decreased by 11 percent from 790 in 1993 to 707 in 1994. See Figure 4. St. Louis City reported more than half of the early syphilis in 1994 with 651 primary and secondary cases and 391 early latent cases. St. Louis County reported a decrease in primary and secondary syphilis identified during 1994 with 214 cases; but an increase in early latent syphilis with 163 cases.

While the decrease to 987 primary and secondary syphilis cases noted in 1994 is significant, it is a 985 percent increase from the 30-year low of 91 cases reported in 1987. See Figure 4.

A large percentage of syphilis cases in all areas of the state continue to appear to be related to crack-cocaine use as persons exchange sex for drugs or money.

The primary and secondary syphilis rate of 13.4 per 100,000 population in Missouri during 1994 is significantly higher than the corresponding national rate of 8.1 per 100,000 population.

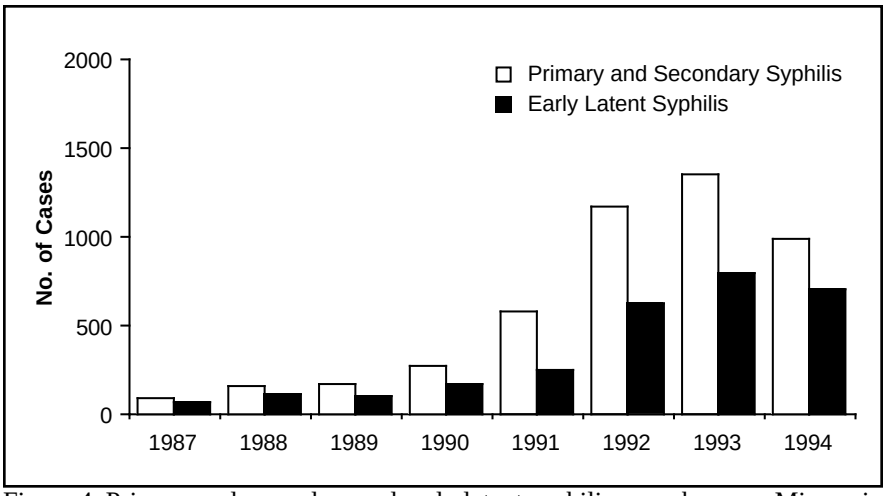


Figure 4. Primary and secondary and early latent syphilis cases by year, Missouri, 1993 and 1994.

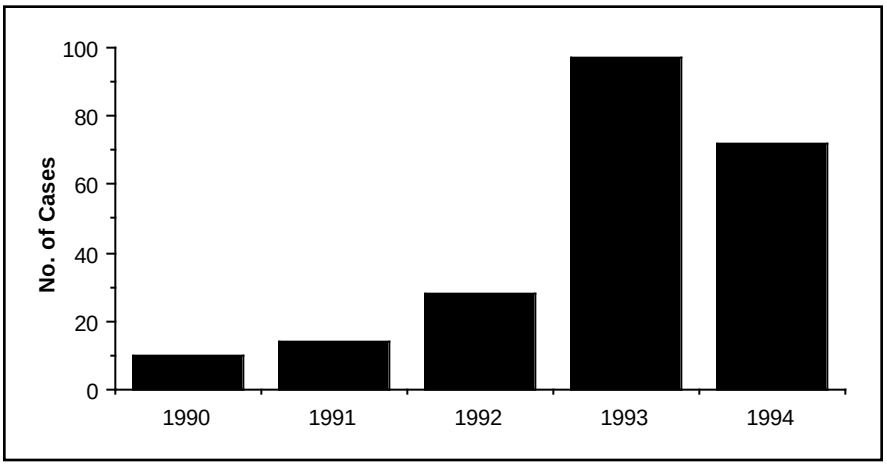


Figure 5. Congential syphilis cases by year, Missouri, 1990–94.

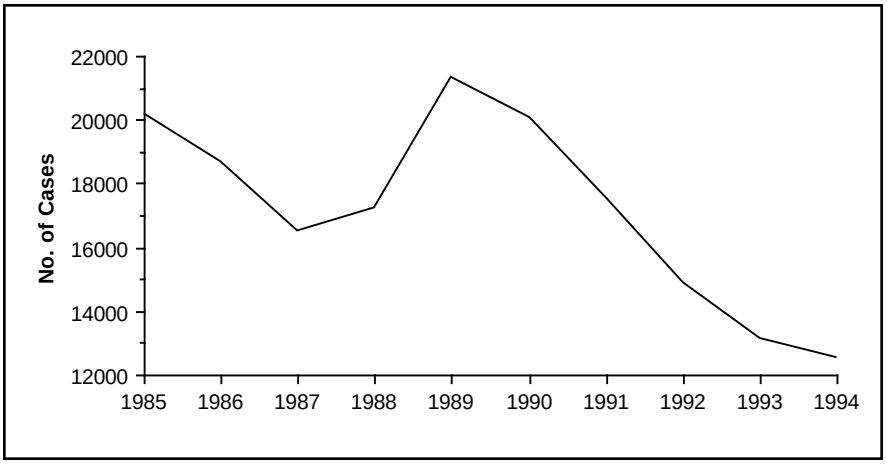


Figure 6. Gonorrhea cases by year, Missouri, 1985–94.

Congenital Syphilis

Congenital syphilis in Missouri decreased 26 percent from 97 cases reported in 1993 to 72 cases in 1994. See Figure 5. The preponderance of congenital syphilis was reported from the St. Louis metropolitan area, with St. Louis City reporting 49 cases or 68 percent and St. Louis County reporting 10 cases or 14 percent of all congenital syphilis in Missouri. The decrease in cases is expected to continue due to increased health care provider awareness, screening, diagnosis and treatment of all stages of syphilis.

Gonorrhea

The reported incidence of gonorrhea in Missouri decreased by 5 percent from 13,147 cases in 1993 to 12,554 in 1994. This corresponds with a decrease in the rate from 251.2 per 100,000 in 1993 to 237.9 per 100,000 in 1994. St. Louis City and Kansas City both reported a decrease in gonorrhea incidence with 5,227 cases (9%) and 2,995 cases (5%), respectively. However, St. Louis County and Outstate Missouri both reported an increase in incidence with 2,459 cases (2%) and 1,873 cases (2%), respectively.

This is the sixth consecutive year in which decreases in gonorrhea incidence

1994 Targeted Age Groups

- Females 14–18 years of age are the largest group testing positive for Chlamydia
- 43 percent of persons with HIV were diagnosed between the ages of 20–29 years
- Persons 25–29 years of age are the largest group diagnosed with syphilis and gonorrhea

have been reported. This trend appears to be supported by a decrease in the positivity observed in the gonorrhea screening project, even though screening has been realigned to target populations at highest risk. All gonorrhea in Missouri is considered to be resistant to penicillin and tetracycline-based medications and no separate data are maintained for penicillinase-producing strains.

Gonococcal Pelvic Inflammatory Disease (GPID)

GPID incidence in Missouri increased slightly from 269 cases reported in 1993 to 286 reported in 1994. Increases in incidence occurred in St. Louis City from 114 cases in 1993 to 120 in 1994 and in St. Louis County from 48 cases in 1993 to 73 in 1994. Decreases in incidence occurred in Kansas City from 28 cases in 1993 to 20 in 1994 and in Outstate Missouri from 79 in 1993 to 73 in 1994.

Non-Gonococcal Urethritis (NGU)

Reported cases of NGU in Missouri decreased 6 percent from 6,425 in 1993 to 6,063 in 1994. Decreases were noted in St. Louis County from 634 cases in 1993 to 265 in 1994 and Outstate Missouri from 658 cases in 1993 to 540 in 1994. Increases were noted in St. Louis City from 3,530 cases in 1993 to 3,635 in 1994 and Kansas City from 1,603 in 1993 to 1,623 in 1994.

Chlamydia trachomatis Infections

Reported *Chlamydia trachomatis* infections in Missouri increased 5 percent from 11,625 cases in 1993 to 12,244 cases in 1994 with over 56 percent of the cases identified in the St. Louis (3,010) and Kansas City (1,838) metropolitan areas. The morbidity rate per 100,000 increased from 227 in 1993 to 232 in 1994. The increased rate can be explained by the increased testing under the Missouri Chlamydia Control Project (MO CCP). Increased screening efforts have increased the number of reported cases. Missouri has identified its highest risk population as individuals age 19 years and under, specifically females between the ages of 14–18, with chlamydia positivity ranging from a high of 11.9 percent to a low of 8 percent for this age range.

Genital Herpes

Genital herpes in Missouri decreased slightly from 3,729 cases reported in 1993 to 3,480 cases reported in 1994.

AIDS Cases

During 1994, 729 cases of AIDS were reported in Missouri residents, which brings the total number of cases reported since 1982 to 5,585. Of these 5,585 cases, 3,116 or 56.6% are known to have died. See Figure 7. In 1993, AIDS was the second leading cause of death for Missourians age 25–34 years.

AIDS cases in Missouri appear, in general, to have plateaued in recent years. See Figure 7. However, this plateauing is not evident in certain subpopulations, such as blacks and persons infected through heterosexual contact, where the annual numbers of reported cases have continued to increase.

The 729 cases of AIDS reported during 1994 represented a 56 percent decrease from the 1,649 cases reported in 1993. This 1994 decrease in cases must be interpreted in light of two events which occurred in 1993 and caused a particularly high number of cases to be reported for that year. These events were:

1. The change to a less restrictive case definition, which allowed many persons infected with HIV to be counted as AIDS cases; and
2. The enhanced surveillance activities in St. Louis and Kansas City during early 1993 as these cities sought to find additional cases of AIDS in order to qualify for increased federal funds. The result was a significant one-time increase in the number of cases reported in 1993.

HIV Cases

Through the end of 1994, a total of 3,221 HIV cases had been reported in

(continued on page 26)

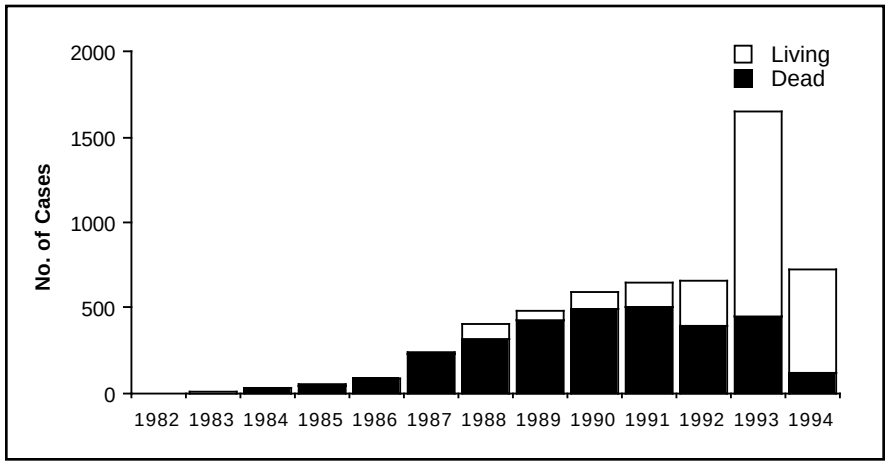


Figure 7. AIDS cases and deaths by year of report, Missouri, 1982–94.

(continued from page 25)
Missouri residents; 641 of these cases were reported during 1994. HIV cases are persons who are infected with HIV but do not meet the case definition for AIDS.

In recent years, the annual rate of HIV infection has remained generally stable among childbearing women in Missouri. The prevalence of HIV infection among those women who delivered a child in 1994 was approximately 6 per 10,000 women. The average HIV prevalence in childbearing women for the period from 1991–94 has been about 5 per 10,000 women.

HIV/AIDS Cases by Gender

The substantial majority of AIDS and HIV cases continue to be reported in males. Of the 5,585 cumulative AIDS cases which have been reported through 1994, 5,227 (94%) were males. However, females have slowly but progressively been making up a larger proportion of annually reported AIDS cases, and in 1994, approximately 8 percent of the total were females.

Females appear to make up a higher proportion of more recently infected persons. This is indicated by the fact that females represent 13 percent of cumulative HIV cases, but only 6 percent of cumulative AIDS cases.

HIV/AIDS Cases by Race and Ethnicity

Whites make up a majority of reported AIDS and HIV cases (71 percent of cumulative AIDS cases and 53 percent of cumulative HIV cases, with white males contributing 67 percent of all AIDS cases and 47 percent of all HIV cases). However, it is African-Americans, along with Latino males, who are overrepresented in the epidemic.

The rate per 100,000 in Missouri for both AIDS and HIV cases is much higher in African-Americans than in whites, with Latinos having intermediate rates. For AIDS cases reported in 1994, the rate in whites was 10 per 100,000, in African-Americans 45 per 100,000 and in Latinos 32 per 100,000. For HIV cases reported in 1994, the rate in whites was 8 per 100,000, in African-Americans 47 per 100,000 and in Latinos 24 per 100,000. On the national scale, the AIDS figures are 17.2 per 100,000 for whites, 100.8 per 100,000 for African-Americans and 51.0 per 100,000 for Latinos. There can be no comparison nationally on HIV figures since all states do not have HIV reporting.

Missouri Communities Disproportionately Represented in AIDS Epidemic in 1994:

- Men who have sex with men represent 69 percent of the reported AIDS cases in Missouri
- African-Americans represent 11 percent of the HIV cases in Missouri (39 percent in United States)
- African-American and Latino HIV infection rates in Missouri are 3–4 times higher than white rates

HIV/AIDS Cases by Age Group

Among cumulative AIDS cases, the largest percentage (45%) were diagnosed between the ages of 30–39; the second largest percentage (24%) were diagnosed between the ages of 20–29. Among cumulative HIV cases, the largest percentage (43%) were diagnosed between the ages of 20–29.

Approximately four percent of all HIV cases were diagnosed in teenagers, this includes 15 percent of cases among African-American females, 9 percent among white females, 4 percent among African-American males and 2 percent among white males. In addition, those AIDS and HIV cases who were first diagnosed in their 20s were more likely to have become initially infected while in their teens. We cannot make a national comparison because all states do not have HIV reporting

HIV/AIDS Cases by Exposure Category

The proportion of annually reported AIDS cases contributed by the men who have sex-with-men (MSM) exposure category has remained constant at 69 percent over the past three years. Injecting drug users constituted 11 percent of the 1994 cases. Heterosexual cases have shown the highest average annual rate of increase in recent years, and during 1994 made up 7 percent of total cases.

Among more recently infected males, an increasing proportion appear to be infected through heterosexual contact and injecting drug use. However, MSM exposure remains a very important means by which new infections are occurring.

Among more recently infected females, an increasing proportion appear to be infected through heterosexual contact.

Almost all recent infections in children have been the result of mother-to-infant transmission.

Prevalence of HIV Infection in Missouri

It is estimated that there are currently 9,800–13,500 HIV-infected individuals living in Missouri. This would indicate that approximately 41–56 percent of HIV-infected persons in the state have been diagnosed and reported to public health officials. It would also indicate that approximately 4,300–8,000 HIV-infected persons are currently living in Missouri who have not been diagnosed and reported.

For additional information:

STD Hotline: (800) 359-6259
AIDS Hotline: (800) 533-2437

The Vaccines for Children Program is Underway

Paula Rosenberg
Bureau of Immunization

On June 1, 1995, the Vaccines for Children (VFC) Program began to accept orders from enrolled private providers for publicly-purchased vaccines, which will be delivered directly to private practices in Missouri.

The VFC Distribution Contract has been awarded to Bond Wholesale Phamaceutical and Medical Supply, Inc., of Tempe, Arizona. This company comes highly recommended for their vaccine handling and safety standards which are above and beyond manufacturer recommendations.

The VFC program is federally-funded and state-operated, and supplies—at no cost to health-care providers who agree to participate—vaccine to be administered to children who are Medicaid-enrolled, uninsured, or Native American/Alaska Native. In addition, those children whose health insurance does not cover immunizations and whose family income is 200 percent of poverty and below can also qualify. Approximately 60 percent of Missouri's children may be eligible for this program.

Why Do We Need VFC?

Today, the challenge to immunize children is tougher: vaccines cost more, new vaccines have been added to the schedule and access to immunizations for children is limited. Private providers have referred parents to public health clinics for assistance, but parents are often faced with crowded clinics and additional time away from work.

In Missouri, surveys indicate that only 65.9 percent of two-year-olds in the public sector have received all the immunizations they need. Past surveys have shown that the private sector maintains about the same level. By using VFC vaccine, private providers will be able to use every opportunity to immunize and protect their patients.

How Does VFC Work?

Providers may enroll at any time during this program. Every attempt has been made to keep this program as simple as possible for busy providers. To participate in the VFC Program, providers need to agree to:

1. Screen the patient for eligibility on the first visit (verification of their status is not required);
2. Follow the Recommended Childhood Immunization Schedule—United States, January 1995, endorsed by the Advisory Committee on Immunization Practices (ACIP), the American Academy of Pediatrics (AAP) and Missouri state law, and the American Academy of Family Practitioners (AAFP). This schedule was published in the March-April issue of the *Missouri Epidemiologist*;
3. Not charge for the VFC-supplied vaccine (although an administration fee may be charged);
4. Provide vaccine information materials as prescribed by law (required of all providers, regardless of their enrollment status in the VFC Program).

A one-time enrollment form agreeing to these standards will be kept on file at the state health department.

Vaccine will be delivered directly to the provider's office or designated delivery site. Once providers receive VFC vaccine, they need not worry about separating VFC vaccine from their other stock.

Packets with more information on VFC, as well as enrollment forms, are available through the VFC Program. Please contact the Bureau of Immunization, Vaccines for Children Program at (800) 219-3224 for more information.

Improvement through Partnership

With public and private sector providers working together, immunization rates can improve to reach the national and state goal of fully immunizing 90 percent of two-year-olds. This is one part of this effort.

MISSOURI VFC
Vaccines for Children
Bee Wise. Immunize.

Providers are encouraged to follow the Standards for Pediatric Immunization Practices. These standards were developed by a committee with representatives from all major medical associations. Providers are also encouraged to take every opportunity to work with their local public health agency as well as to educate parents about the number of visits needed for full immunization protection.

For a free copy of these standards, please feel free to contact the Vaccines for Children Program at (800) 219-3224.

Vaccine-Preventable Diseases - 1994

(continued from page 21)

the previous year, it indicates that as many as 36,000 of Missouri's 2-year-olds are susceptible to potentially deadly, preventable diseases. Efforts to improve immunization levels must continue. The two goals of the State of Missouri are to increase the vaccination levels of 2-year-olds to at least 90 percent for initial and most critical doses by 1996; and by the Year 2000, implement a system to ensure that at least 90 percent of all 2-year-olds receive the full series of vaccines.

All vaccine-preventable diseases should be reported to local health departments or the Missouri Department of Health.

Tuberculosis 1994 Annual Report

Dan Ruggiero
Bureau of Tuberculosis Control

The Centers for Disease Control and Prevention (CDC) has announced that tuberculosis cases continue to decline nationally for the second year in a row. Data from the CDC for 1994 indicates that there were 24,368 new tuberculosis cases, for a case rate of 9.4 per 100,000 population. This represents a decrease of 3.7 percent over the 25,287 cases reported in 1993 for a case rate of 9.8.

In contrast, Missouri's tuberculosis cases continue to increase slightly. In 1994, 260 new tuberculosis cases were reported, for a case rate of 5.0 per 100,000 population. This is a 1.6 percent increase over 1993 when 256 cases were reported. This represents the second year in a row that tuberculosis cases have gone up in Missouri. Over the last ten years, the numbers of cases have fluctuated from a high of 339 cases in 1987 to an all time low of 245 in 1992. See Figure 1.

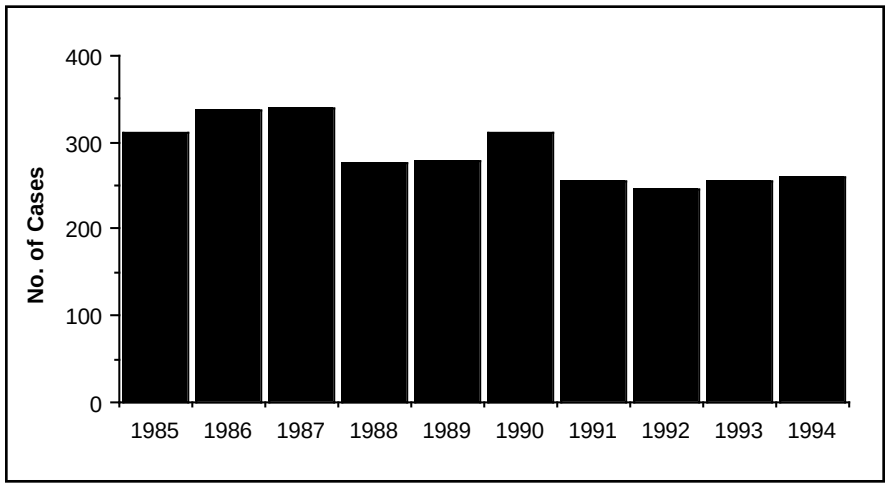


Figure 1. Number of tuberculosis cases in Missouri, 1985–94.

As in prior years, pulmonary tuberculosis accounted for the majority of the cases reported; 216 (85%) compared to 44 (15%) with extrapulmonary disease. There were 13 cases (5%) where the diagnoses contained two disease sites. The predominate sites for extrapulmonary disease were lymphatic, bone/joint and pleural tuberculosis. Bacteriologic confirmation was obtained on 184 (85.2%) of the pulmonary and 36 (81.8%) of the extrapulmonary cases. See Figure 2.

Males accounted for 160 (61.5%) of the cases, with females making up the remaining 100 (38.5%).

There continues to exist a disproportionately higher incidence of disease among Missouri's minorities. Tuberculosis disease varied significantly among different racial and ethnic groups. Of the 260 cases reported in 1994, whites accounted for 159 (61.2%), African-Americans 67 (25.8%), Latinos 8 (3.1%), Asians/Pacific Islanders 25 (9.6%) and Native Americans 1 (0.4%). When comparing case rates per 100,000 population, whites have the lowest case rate at 3.4 compared to Native Americans at 4.3, African-Americans at 12.0, Latinos at 12.6 and Asians at 61.8. African-Americans and Latinos have case rates disproportionate to whites, greater than the national rate of 9.4 and more than double the state rate of 5.0. Asians have case rates that are 12 times the state rate and six times the national. See Figure 3.

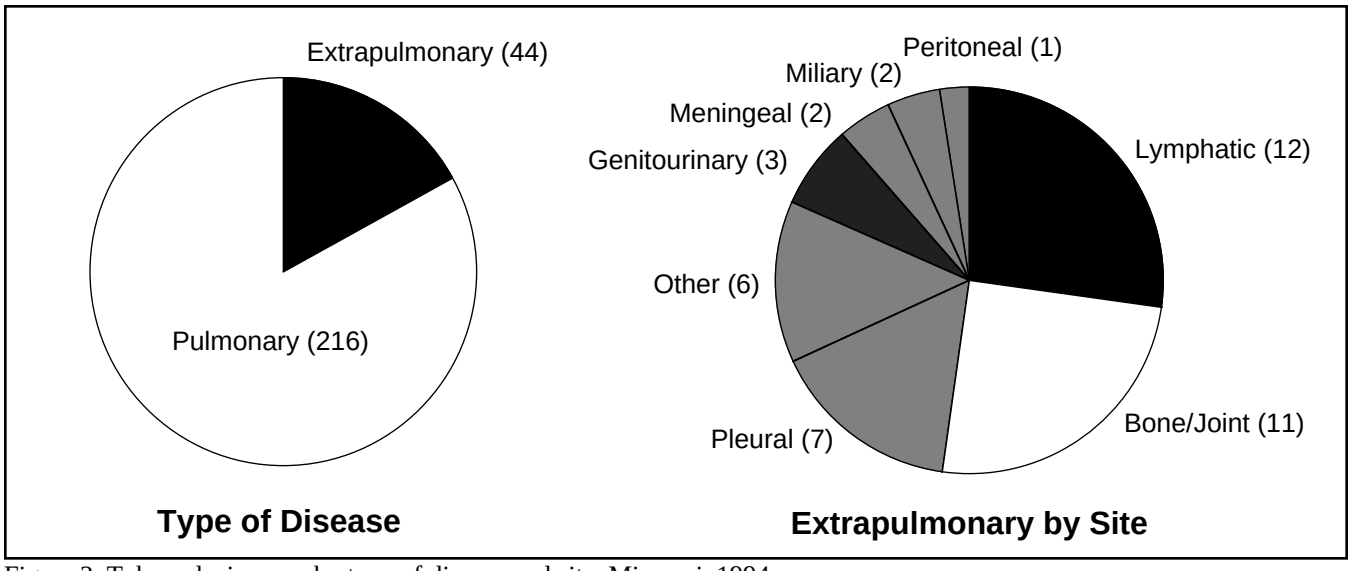


Figure 2. Tuberculosis cases by type of disease and site, Missouri, 1994.

The elderly continue to make up the largest percentage of all tuberculosis cases in Missouri. In 1994, 35.8 percent (93/260) of the cases occurred among individuals over 65 years of age. This represents a decrease from 1993, when 37.5 percent (96/256) of the cases were reported in the elderly. A decrease of 9.6 percent (25/260) was also noted in the under 25 year age group. The 0–4 age group increased by one case, accounting for 4.2 percent of the total cases, while the 5–14 age group experienced a 3.6 percent decrease and the 15–24 age group experienced a 33.3 percent decrease over 1993. The largest increase occurred in the 25–44 age group with 33.3 percent. See Figure 4.

The number of reported cases in Missouri in 1994 varied by geographical areas, with the majority of cases in large urban centers such as St. Louis City, St. Louis County, Kansas City and Springfield-Greene County. This represents a reversal of the previous trend when most of the cases were reported by the outstate areas. In 1994, there were 41 cases from St. Louis City, a decrease from 43 the previous year; 42 cases in St. Louis County, an increase from 36 in 1993; 14 in Springfield-Greene County, an increase from 9; and 39 in Kansas City, an increase from 37 in 1993. Three of the four urban centers experienced increases between 5.4 percent and 55.6 percent. Springfield-Greene County experienced the greatest increase in 1994. See Figure 5.

In the outstate areas, two out of the six districts experienced increases in the number of tuberculosis cases reported. Three districts reported declines, and one was even with the previous year. Overall, a decline of 5.3 percent was noted in the outstate area. The Northeastern District experienced the greatest increase, from two cases in 1993 to nine in 1994, while the Southeastern District experienced an increase from 34 in 1993 to 39 in 1994. Tuberculosis cases in the Northwestern District remained the same at 15 cases, while the Southwestern District declined from 26 to 18, the Eastern District decreased from 17 to 8 and the Central District decreased from 29 in 1993 to 26 in 1994. Tuberculosis cases in correctional facilities or institutional settings increased by one over the previous year. See Figure 6.

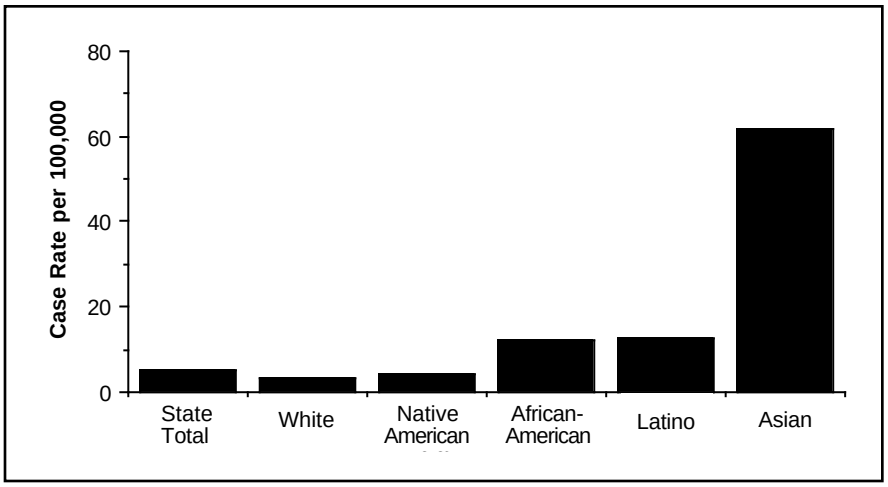


Figure 3. Tuberculois case rates per 100,000 population by race/ethnicity, Missouri, 1994.

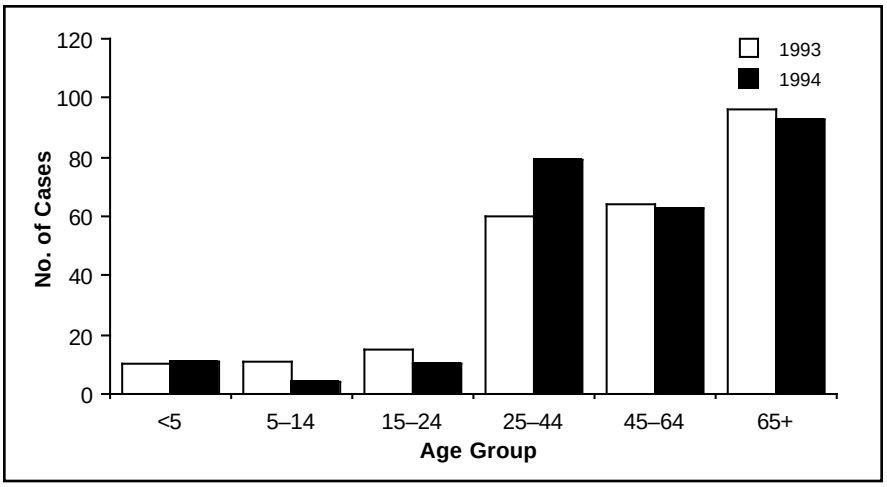


Figure 4. Tuberculosis incidence by age group, Missouri, 1993 and 1994.

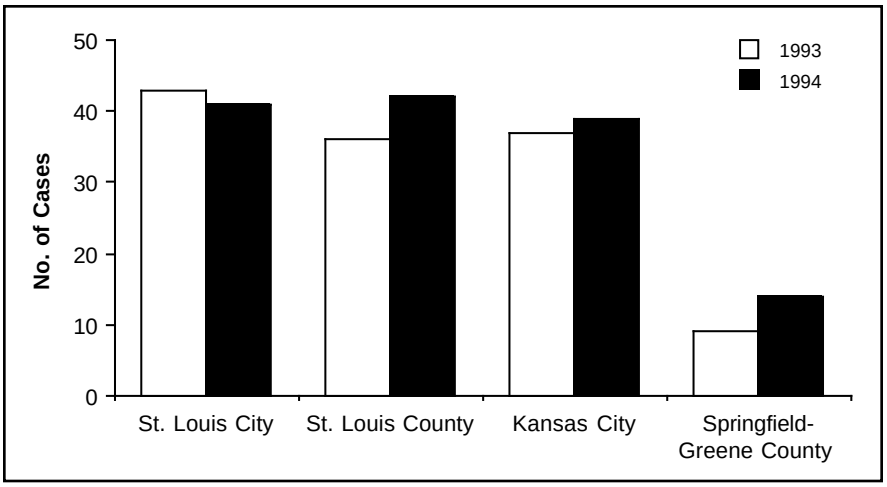


Figure 5. Tuberculosis cases by metropolitan area, Missouri, 1993 and 1994.

Drug-resistant cases continue to increase each year. In 1991, out of 202 isolates submitted for drug susceptibility testing, 15 (7.4%) were drug-resistant com-

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pared to 22 out 226 isolates (9.7%) in 1994. Out of the 226 isolates, 6.6 percent were resistant to Isoniazid, 1.8 percent to Rifampin, 1.8 percent to Pyrazinamide, 4 percent to Streptomycin, 1.3 percent to Isoniazid and Rifampin and 2.2 percent to two or more first line drugs. See Figure 7. Of the 22 drug-resistant cases, 18 were resistant to one drug, 2 to three drugs and 2 to four drugs. This represents an increase over 1993 when 18 cases were reported to be resistant to one or more anti-tuberculosis drugs.

Of concern is the increasing number of cases being identified among high-risk groups in Missouri. Among them are inmates in correctional centers, patients in long-term care facilities, HIV-infected individuals and the foreign-born.

During 1994, there were nine tuberculosis cases identified in correctional facilities, an increase over 1993 when eight cases were reported. Of the nine inmates reported with tuberculosis disease, one was identified as having multi-drug-resistant organisms. While this may not represent a significant increase, case rates are substantially higher in this population. The case rate is estimated to be in excess of 45 per 100,000 population in Missouri's inmate population. This is almost five times the national and nine times the state rate.

Case rates were also substantially higher in residents of long-term-care facilities. During 1994, there were 19 (7.3%) cases of tuberculosis reported in long-term-care facilities, 15 of which were in nursing homes. Based on approximately 57,000 persons living in Missouri's nursing homes, this represents a case rate of 33.3 per 100,000 population, substantially higher than both state and national rates.

The World Health Organization estimates that during this decade there will be 90,000,000 new tuberculosis cases and 30,000,000 deaths related to tuberculosis worldwide if current trends prevail. Tuberculosis remains the leading cause of death in the world today among children under ten years of age. In the United States, over 30 percent of all reported cases occur among foreign-born and this figure continues to in-

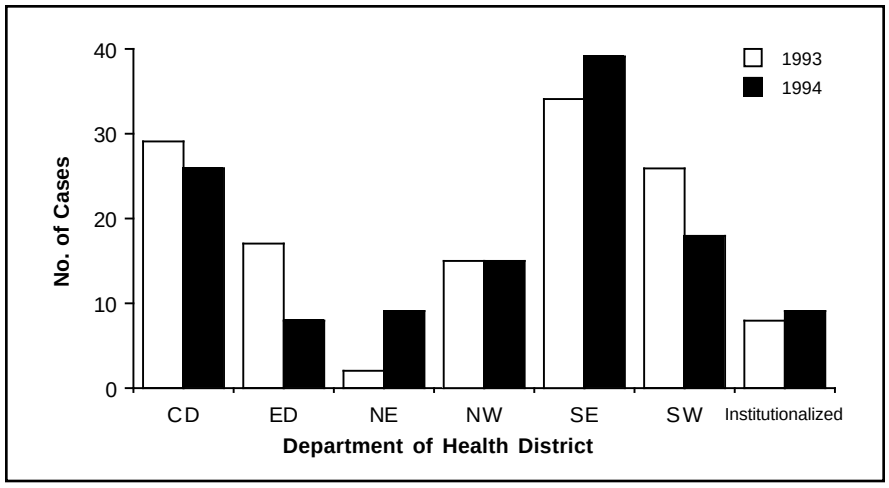

Figure 6. Tuberculosis cases by Department of Health district, Missouri, 1993 and 1994.

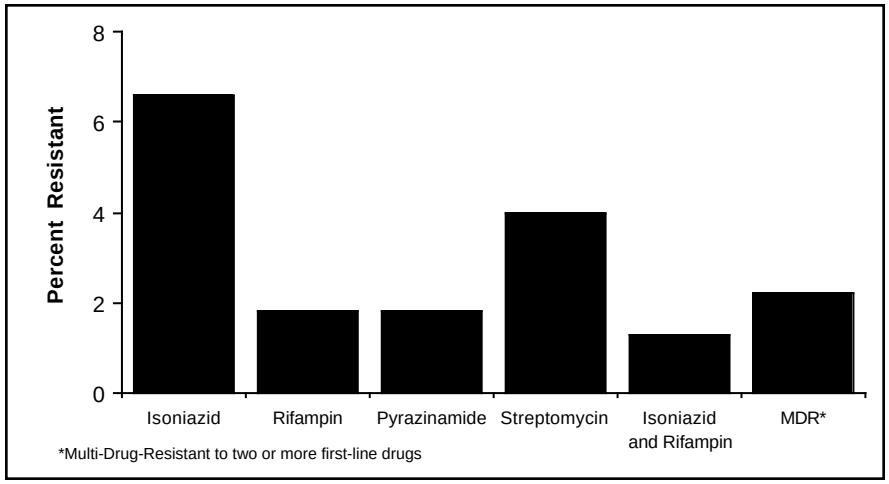

Figure 7. Percentage of resistance to anti-tuberculosis drugs, Missouri, 1994.

Table 1. Tuberculosis/AIDS cases by city or county, Missouri, 1990–94

City or County	1990	1991	1992	1993	1994	Total
St. Louis City	1	3	4	5	6	19
St. Louis County	1	0	1	3	3	8
Kansas City-Jackson County	2	1	0	7	5	15
Springfield-Greene County	0	0	0	1	2	3
Outstate	1	0	2	2	4	9
Institutionalized	2	4	3	3	1	13
Total	**7**	**8**	**10**	**21**	**21**	**67**

crease each year. In 1990, foreign-born cases accounted for 5.8 percent (18) of the reported cases, compared to 13.8 percent (30) in 1994. Increasing cases were especially noted among Missouri's foreign-born population coming from Asia. Case rates for the Asians increased significantly from 48.0 per 100,000 population in 1993 to 61.8 in 1994.

The number of TB/HIV cases in Missouri during 1994 remained the same as 1993, with 21 cases reported. Over 75 percent were reported from the four largest urban centers of the state, St. Louis City, St. Louis County, Kansas City and Springfield-Greene County. Cases were evenly divided between whites and minorities. Since 1990, cases have continued to increase from 7 to 21. See Table 1.

In order to reverse current trends and achieve the desired goal of reducing the number of new tuberculosis cases to 175 by the year 2000, the Bureau of Tuberculosis Control recommends that tuberculosis control programs in Missouri focus their attention to implementing three top priorities:

1. Ensure that all persons with tuberculosis disease are placed on an effective anti-tuberculosis drug regimen that will render the patient non-infectious as rapidly as possible and that all such persons will complete a full course of treatment. The bureau is advocating that all tuberculosis patients with disease be placed on directly observed therapy (DOT) as the best way to ensure completion of therapy.

2. Ensure that all contacts to tuberculosis cases are identified and examined and those requiring preventive therapy complete a full course of treatment.

3. Ensure that all high-risk persons with tuberculosis infection for whom preventive treatment is appropriate complete the entire prescribed course of treatment.

Bureau of Communicable Disease Control - 1994

(continued from page 3)
1993 to 175 in 1994, and down 35.7 percent from the five-year median of 272 cases. See Figure 4. Decreases in reported cases in 1994 were seen in all health districts. See Figure 6.

Haemophilus influenzae type b (Hib) Disease

Reported cases of Hib meningitis decreased 41.6 percent, from 12 cases in 1993 to 7 cases in 1994. The 1994 total is 83.3 percent lower than the five-year median of 42 cases. See Figure 4. No increases in the number of Hib meningitis cases were reported from any district during 1994, with the exception of the Northwestern district, which had one case in 1994 compared to none in 1993. See Figure 6.

Reported cases of other invasive (non-meningitis) Hib disease decreased by 64.2 percent, from 123 cases in 1993 to 44 cases in 1994. See Figure 4. This decrease may be due to the termination of the Bacterial Surveillance Project. This project, through the use of active surveillance, identified additional cases which would not have been detected by the standard passive surveillance system. Non-meningitis invasive Hib disease was down in all districts in 1994. See Figure 6. Since other invasive Hib disease has been reportable only since 1990, there is no five-year median.

The age distribution of Hib disease has changed in recent years with the widespread use of Hib vaccines, and meningitis is no longer the most common expression of the disease. Specifically, there has been a reduction in the number of cases of Hib meningitis in children under five years of age.

Legionellosis

Reported cases of Legionellosis increased 24.2 percent, from 33 cases in 1993 to 41 cases in 1994. The increase is believed to have resulted from enhanced laboratory capabilities to detect the presence of *Legionella* infection.

REFERENCE:

1. CDC. *E coli* O157:H7–what the clinical microbiologist should know. March 1994.

New Daycare Immunization Rule Outlines Requirements

The Department of Health has proposed a new rule outlining the immunizations required for daycare attendance in Missouri. This rule will apply to any licensed daycare with ten or more children.

The proposed rule further defines the daycare attendance law which requires children in daycare to have all age-appropriate vaccines as defined by the Advisory Committee on Immunization Practices (ACIP). The appropriate vaccines are outlined in the current *Recommended Childhood Immunization Schedule, United States*. Of note, is the fact that **the hepatitis B vaccine series will be required** for daycare attendance for any child born January 1, 1990 or after. (The Headstart Program has also added hepatitis B as a requirement under their new federal guidelines.)

The proposed rule has been approved by the State Board of Health and was published in the *Missouri Register* on May 15, 1995. An emergency rule will be filed to make the rule become effective in August 1995.

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Upcoming Conference

THE ESSENTIALS OF INFECTION CONTROL
5TH ANNUAL CONFERENCE

September 13-15, 1995
Capitol Plaza Hotel, Jefferson City, MO

Purpose
This three-day conference will begin to prepare healthcare professionals as facilitators and resource persons in prevention and control of common nosocomial infections. It will also help the professional develop skills in managing the everyday responsibilities of infection surveillance, analysis of disease data and resolving infection control problems in a facility.

Sponsors
Co-sponsored by the Missouri Department of Health and eight other organizations.

Registration
For a complete conference brochure and registration form, call (314) 751-6115.

You Should Attend If You Are A:
- **Nurse** (RN, LPN) or **medical technologist/technician** responsible for infection control in an acute care hospital, long-term care facility (nursing home, mental health, developmental disabilities, rehabilitation), or home health agency.
- **Physician** responsible as medical director or consultant to an infection control program.
- **Health facility consultant** responsible for surveys, investigations and licensing.
- **Public health professional** responsible for assisting with facility outbreaks and infectious disease follow-up in the community.
- **Nursing home administrator** needing information on infection control in long-term care.

Missouri EPIDEMIOLOGIST

Volume XVII, Number 4 *July-August 1995*

Cryptosporidium in Drinking Water

The Centers for Disease Control and Prevention (CDC) and the United States Environmental Protection Agency (EPA) jointly developed the following guidelines concerning *Cryptosporidium* in drinking water.

Guidance for People With Severely Weakened Immune Systems

Introduction

Cryptosporidium is a parasite commonly found in lakes and rivers, especially when the water is contaminated with sewage and animal wastes. *Cryptosporidium* is very resistant to disinfection, and even a well-operated water treatment system cannot ensure that drinking water will be completely free of this parasite. Current EPA drinking water safety standards were not explicitly designed to assure the removal or killing of *Cryptosporidium.* Efforts are now underway to resolve a number of scientific uncertainties that will enable EPA to set specific safety standards for this parasite in the future.

Cryptosporidium has recently caused several large waterborne disease outbreaks of gastrointestinal illness, with symptoms that include diarrhea, nausea and/or stomach cramps. People with severely weakened immune systems (that is, severely immunocompromised) are likely to have more severe and more persistent symptoms than healthy individuals. Moreover, *Cryptosporidium* has been a contributing cause of death in some immunocompromised people. Individuals who are severely immunocompromised may include those who are infected with HIV/AIDS, cancer and transplant patients taking immunosuppressive drugs and people born with a weakened immune system.

Background

Data are not adequate to determine how most people become infected. For example, we do not know the importance of drinking water compared to other possible sources of *Cryptosporidium*, such as exposure to the feces of infected persons or animals, sex involving contact with feces, eating contaminated food or accidently swallowing contaminated recreational water.

Thus, in the absence of an outbreak, there are insufficient data to determine whether a severely immunocompromised person is at a noticeably greater risk than the general public from waterborne cryptosporidiosis. Even a low level of *Cryptosporidium* in water, however, may be of concern for the severely immunocompromised, because the illness can be life-threatening. The risk of a severely immunocompromised person acquiring cryptosporidiosis from drinking water in the absence of an outbreak is likely to vary from city to city, depending on the quality of the city's water source and the quality of water treatment. Current risk data are not adequate to support a recommendation that severely immunocompromised persons in all United States cities should boil or avoid drinking tap water.

In the absence of a recognized outbreak, this guidance has been developed for severely immunocompromised persons who may wish to take extra precautions to minimize their risk of infection from waterborne cryptosporidiosis. To be effective, the guidance must be followed consistently for all water used for drinking or for mixing beverages. During outbreaks of waterborne cryptosporidiosis, studies have found that people who used extra precautions only part of the time were just as likely to become ill as people who did not use them at all.

Guidance

EPA and CDC have developed the following guidance for severely immunocompromised persons who may wish to take extra precautions. Such individuals should consult with their health care provider about what measures would be most appropriate and effective for re-

(continued on page 8)

Inside this Issue...

Recommendations for the Use of Influenza Vaccine, 1995–96

The following is a summary of current recommendations on influenza vaccine from the Advisory Committee on Immunization Practices (ACIP). The complete ACIP statement was published in *Morbidity and Mortality Weekly Review, Recommendations and Reports*, April 21, 1995, Vol. 44, No. RR-3.

Influenza vaccine is strongly recommended for any person 6 months of age or older who is at increased risk for complications of influenza. Members of high risk groups are more likely than the general population to require hospitalization if they become ill with influenza. The following persons are at highest risk. They and their close contacts should be targeted for organized vaccination programs.

- Persons 65 years of age and older.
- Residents of nursing homes and other chronic-care facilities that house persons of any age with chronic medical conditions.
- Adults and children with chronic disorders of the pulmonary and cardiovascular systems, including asthma.
- Adults and children who required regular medical follow-up or hospitalization during the preceding year because of chronic metabolic diseases (including diabetes mellitus), renal dysfunction, hemoglobinopathies or immunosuppression (including immunosuppression caused by medications).
- Individuals 6 months to 18 years of age who are receiving long-term aspirin therapy and, therefore, might be at risk for developing Reye syndrome after influenza.

Groups that can transmit influenza to persons at high risk should also be immunized. These groups include:

- Physicians, nurses and other personnel in both hospital and outpatient-care settings;
- Employees of nursing homes and chronic-care facilities who have contact with residents;
- Providers of home care to persons at high risk; and
- Household members (including children) of persons in high-risk groups.

Any person who wishes to reduce the likelihood of becoming ill with influenza should receive the vaccine. Administration of influenza vaccine is considered safe at any stage of pregnancy.

The optimal time for organized vaccination campaigns for persons in high-risk groups is usually the period from mid-October through mid-November. In the United States, influenza activity generally peaks between late December and early March. Administering vaccine too far in advance of the influenza season should be avoided, especially for nursing home residents, because antibody levels may begin to decline within a few months of vaccination.

Influenza vaccine should not be administered to persons known to have anaphylactic hypersensitivity to eggs or to other components of the influenza vaccine. Flu vaccine contains only noninfectious viruses, and cannot cause influenza. Respiratory disease after vaccination represents coincidental illness unrelated to influenza vaccination. The most frequent side effect of vaccination, reported by fewer than one third of vaccinees, is soreness at the injection site. Unlike the 1976 swine influenza vaccine, subsequent vaccines prepared from other virus strains have not been clearly associated with an increased frequency of Guillain-Barré syndrome.

The trivalent influenza vaccine prepared for the 1995–96 season will include A/Texas/36/91-like (H1N1), A/Johannesburg/33/94-like (H3N2) and B/Beijing/184/93-like hemagglutinin antigens. The actual influenza type B strain used by United States manufacturers is B/Harbin/07/94, which is antigenically equivalent to the B/Beijing/184/93 strain.

A summary of the 1994–95 influenza season in Missouri can be found on pages 4 and 7 of this issue.

Surveys indicate that less than one-half of the high-risk populations receive influenza vaccine each year.* More effective strategies are needed for delivering vaccine to persons at high risk and to their health-care providers and household contacts. Successful vaccination programs have combined education for health-care workers, publicity and education targeted toward potential recipients, a plan for identifying persons at high risk (usually by medical-record review) and efforts to remove administrative and financial barriers that prevent persons from receiving the vaccine.

Outpatient Clinics and Physicians' Offices

Staff in physicians' offices, clinics, health-maintenance organizations and employee health clinics should be instructed to identify and label the medical records of patients who should receive vaccine. Vaccine should be offered during visits beginning in September and throughout the influenza season. The offer of vaccine and its receipt or refusal should be documented in the medical record. Patients in high-risk groups who do not have regularly scheduled visits during the fall should be reminded by mail or telephone of the need for vaccine.

Facilities Providing Episodic or Acute Care

Health-care providers in these settings (e.g., emergency rooms and walk-in clinics) should be familiar with influenza vaccine recommendations. They should offer vaccine to persons in high-risk groups or should provide written information on why, where and how to obtain the vaccine.

Nursing Homes and Other Residential Long-Term-Care Facilities.

Vaccination should be routinely provided to all residents of chronic-care facilities with the concurrence of attending physicians rather than by obtaining individual vaccination orders of each patient. Consent for vaccination should be obtained from the resident or a family member at the time of admission to the facility, and all residents should be vaccinated at one time, immediately preceding the influenza season. Residents admitted during the winter months after completion of the vaccination program should be vaccinated when they are admitted.

Acute-Care Hospitals

All persons 65 years of age or older, and younger persons (including children) with high-risk conditions who are hospitalized at any time from September through March should be offered and strongly encouraged to receive influenza vaccine before they are discharged. Household members and others with whom they will have contact should receive written information about why and where to obtain influenza vaccine.

Visiting Nurses and Others Providing Home Care to Persons at High Risk

Nursing care plans should identify patients in high risk groups, and vaccine should be provided in the home if necessary. Caregivers and other persons in the household (including children) should be referred for vaccination.

Health Care Workers

Administrators of all health care facilities should arrange for influenza vaccine to be offered to all personnel before the influenza season. Personnel should be provided with appropriate educational materials and strongly encouraged to receive vaccine. Particular emphasis should be placed on vaccination of persons who care for members of high-risk groups (e.g., staff of intensive care units [including newborn intensive care units], staff of medical/surgical units and employees of nursing home and chronic care facilities). Using a mobile cart to take vaccine to hospital wards or other work sites and making vaccine available during night and weekend work shifts can enhance compliance, as can a follow-up campaign early in the course of a community outbreak.

*Medicare began paying for influenza vaccine in 1993. However, during that same year in Missouri, Medicare provided reimbursement for this vaccine for less than 35 percent of its beneficiaries. Local health agencies and nursing homes who are not currently Medicare providers may apply, through a simplified application process, for a special provider number which will allow them to receive reimbursement for influenza vaccine given to Medicare beneficiaries. Any questions about this process should be directed to the Bureau of Immunization at (314) 751-6133.

State Public Health Laboratory Report

Newborn Screening — Hypothyroidism, Phenylketonuria, Galactosemia and Hemoglobinopathies

James Baumgartner, B.S., M.B.A., Chief, Metabolic Disease Unit

	Jan 95	Feb 95	Total YTD
Specimens Tested	10,033	9,247	19,280
Initial (percent)	64.2%	63.0%	12,269
Repeat (percent)	35.8%	37.0%	7,011
Specimens: Unsatisfactory	147	186	333
HT Borderline	966	926	1,892
HT Presumptive	54	52	106
PKU Borderline	23	27	50
PKU Presumptive Positive	1	1	2
GAL Borderline	67	56	123
GAL Presumptive Positive	2	2	4
FAS (Sickle cell trait)	92	71	163
FAC (Hb C trait)	25	25	50
FAX (Hb variant)	15	13	28
FS (Sickle cell disease)	2	0	2
FSC (Sickle C disease)	2	0	2
FC (Hb C disease)	3	0	3

HT = Hypothyroidism, PKU = Phenylketonuria, GAL = Galactosemia, Hb = Hemoglobin, YTD = Year to Date

(see additional reports on page 15)

1994-95 Influenza Summary

Irene Donelon
Bureau of Communicable Disease Control

There were a total of 389 laboratory-confirmed cases of influenza reported in Missouri during the 1994–95 season. Three hundred and seventy-seven cases were type A, with 37 subtyped as A/Shangdong-like (H3N2). There were 12 cases of type B influenza reported with one case reported in week nine subtyped as B/Panama-like.

The 1994–95 influenza season was characterized by outbreaks in a variety of settings. There were six outbreaks reported in long term care facilities with one confirmed as type A Shangdong-like and two as type A (not subtyped). Attack rates in residents in these long term care facilities ranged from two percent to 54 percent. Outbreaks of influenza-like illness were reported in five schools with three closings; none of the school outbreaks were laboratory confirmed. An outbreak of influenza-like illness was reported in employees of a home health agency (not laboratory confirmed).

The first culture-confirmed case of influenza (type A/Shangdong-like) was reported on January 5, 1995 in a 33 year old resident of Laclede County. Influenza-like illness peaked during week 10 and then declined to baseline levels during the next three weeks. As can be seen in Figure 1, the level of influenza-like illness during this season was well below that of last season and the previous eight-year average. Laboratory-confirmed influenza cases also peaked during week 10 of 1995. See Figure 2. Pneumonia and influenza deaths fluctuated around the previous 11-year average early in the season and then increased during weeks 11 through 14. See Figure 3. Increased mortality rates are not uncommon in seasons when type A (H3N2) influenza is circulating.

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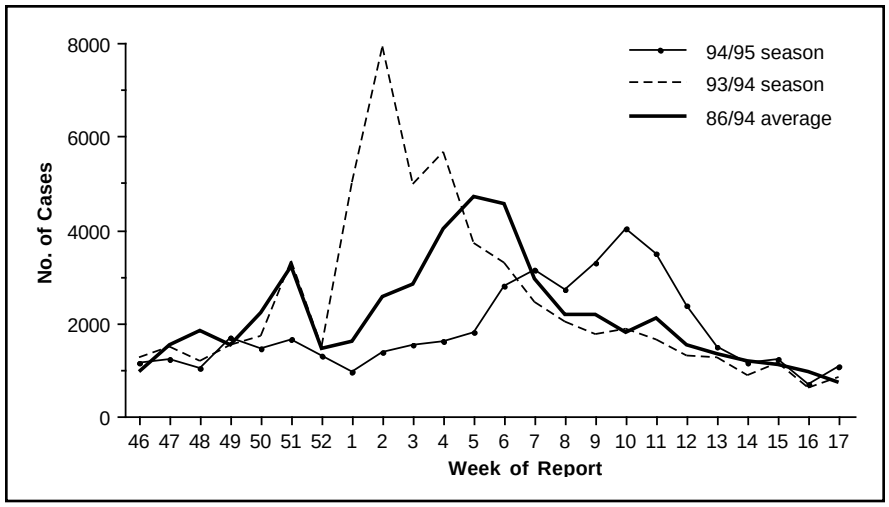

Figure 1. Influenza-like illness by week of report, Missouri, 1994/95 season, 1993/94 season and 1986/94 average.

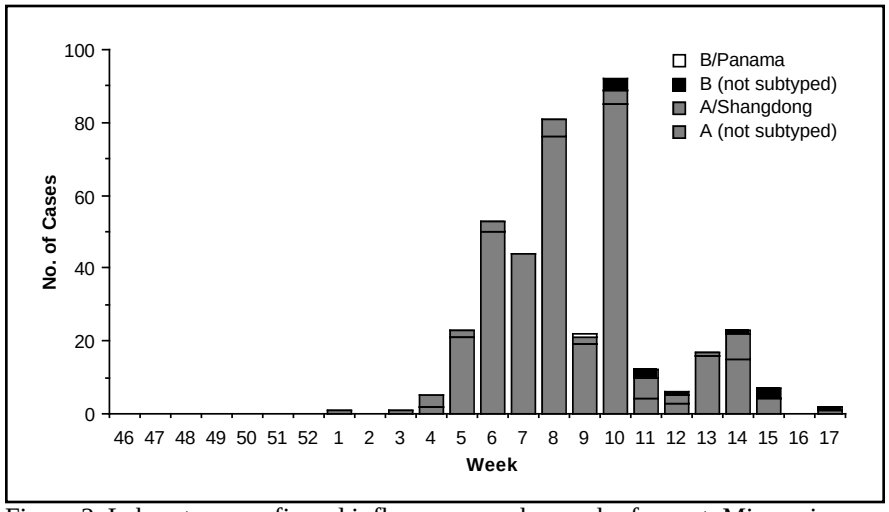

Figure 2. Laboratory-confirmed influenza cases by week of report, Missouri, 1994/95 season.

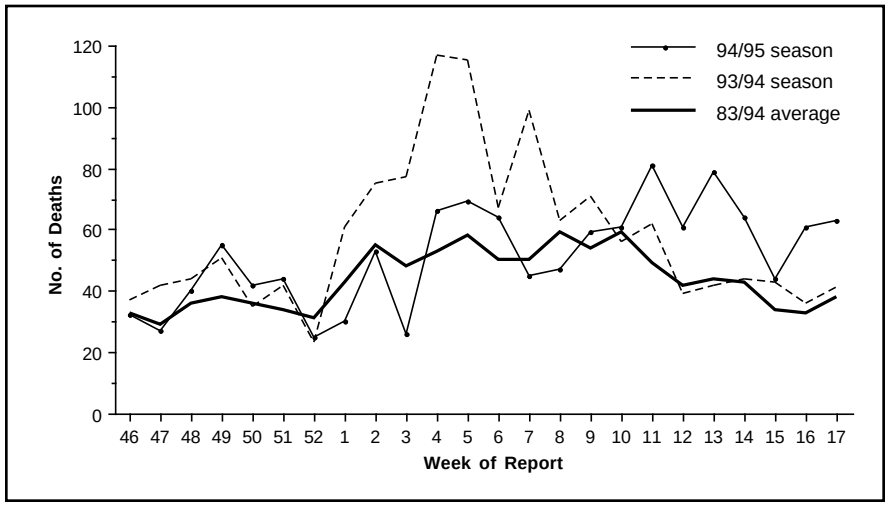

Figure 3. Pneumonia and influenza deaths by week of report, Missouri, 1994/95 season, 1993/94 season and 1983/94 average.

Allergic Reactions to Mold Caused by Flooding

Scott Clardy
Bureau of Environmental Epidemiology

During the summer of 1993, extensive flooding occurred in Missouri and other areas of the Midwestern United States. A survey by Wedner, et al. in the fall of that year found vast quantities of molds (up to 27,773/M^3) in buildings which had undergone flood damage. It was suggested that the presence of such molds could pose a significant health hazard to residents and workers exposed to these indoor environments during cleanup and repairs.[1]

The clinical manifestations of hypersensitivity to fungi occurring in the natural outdoor environment are usually cyclic or seasonal. Exposure to these fungi can be minimized by adopting avoidance strategies. However, molds in the indoor environment, where Americans, on average, spend over 90 percent of their time, present a greater health hazard because of almost continual exposure.

During the winter of 1993, the Missouri Department of Health (DOH) was notified of several episodes of illness which were suspected to be allergic reactions to molds associated with the flood waters. In response, DOH initiated an active surveillance program to locate individuals suffering from such mold-associated allergic illnesses in order to determine the distribution and severity of these reactions, and to ensure that proper environmental follow-up was performed.

Ninety-nine physicians from different areas of Missouri agreed to participate in this study. The physicians had primary or secondary specialties in allergies or pulmonary diseases and were located in flood-affected areas and/or were likely to get referrals from such areas. Figure 1 shows the number of participating physicians by county.

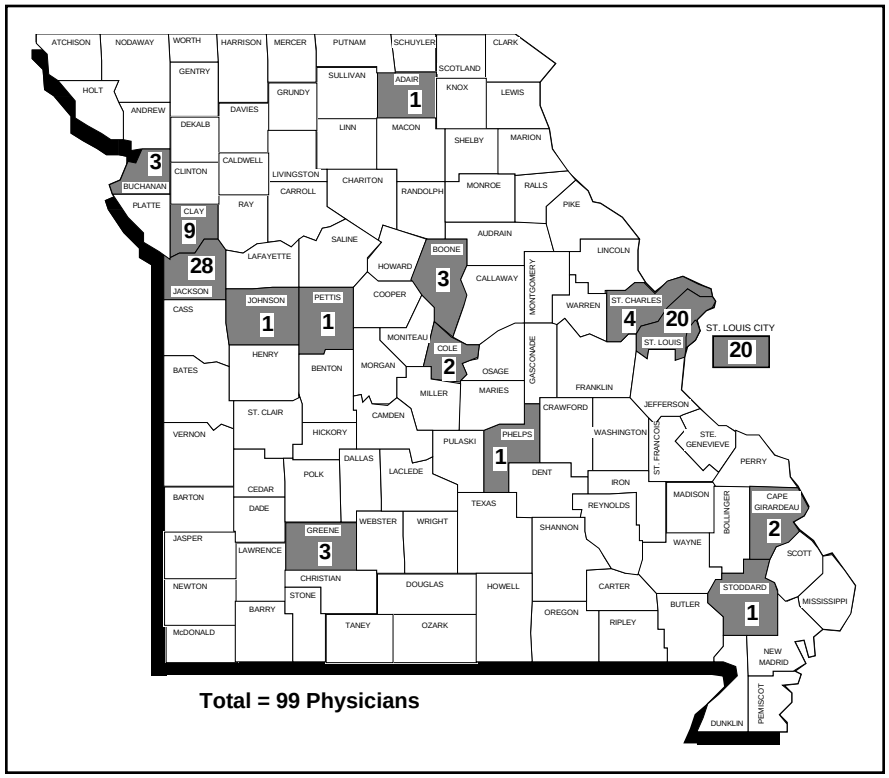

Figure 1. Numbers and locations of physicians participating in active surveillance for allergic reactions associated with flood-related mold, Missouri, May 30–December 31, 1994.

Biweekly calls were made to each physician's office to obtain the following:

1. The number of cases seen in the previous two weeks;

2. Demographic data (including name, age, race, sex and address of the patient);

3. Date of onset of illness; and

4. Permission to contact the patient to make sure they are obtaining any available remediation assistance.

For this program, a case was defined as any allergic reaction to mold associated with flooding during 1993 or 1994. Symptoms of allergic reaction could include sinusitis, allergic rhinitis, conjunctivitis, asthma and dermatitis. Data were collected during the period from May 30, 1994 through December 31, 1994.

Some physicians were reluctant to release personal identifiers of their patients. Two approaches were used to resolve this situation. In a few cases, all information needed except the patient's name and street address was obtained directly from the physician. In most cases, however, the physician's office called the patient and obtained permission for DOH to contact them directly. This approach was preferable because it allowed DOH personnel conducting the study to have personal contact with the cases. This generally led to obtaining more information than would have been received from the physician alone. Di-

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rect contact with the patient was especially useful in determining whether proper cleanup had been done in their homes or offices.

Through the active surveillance program, DOH identified 19 physician-diagnosed cases of allergic reactions to mold associated with flooding. Of these cases, 15 (79%) were female and four (21%) were male. See Figure 2. Sixteen of the 19 cases were white; the race of the remaining three cases could not be determined.

The average age of the cases was 35 years, with a range of 6 to 51 years. The age of one case could not be obtained. The average age for females was 36 years; the average age for males was 31 years. Seven (37%) of the 19 total cases were in the age group of 37–48 years, while six (32%) were in the 25–36 age group. Six (40%) of the 15 female cases were in women aged 37–48 years; four (27%) of the female cases were in the age group of 25–36 years. Two (50%) of the four male cases were in men aged 25–36 years.

Cases were located throughout the state. However, 12 cases (63%) were located in eastern Missouri in the general area of the confluence of the Mississippi and Missouri Rivers. Figure 3 shows the number of cases by county.

Date of onset was obtained for 14 of the 19 cases, and ranged from July 1, 1993 through June 15, 1994 (following some flooding in late April and early May 1994). Eight (57%) of the 14 cases for which onset was determined had symptoms by the end of September 1993. Three (21%) of the 14 cases had onset between the flooding which occurred in late April 1994 and June 15, 1994.

Most of the cases attributed their allergic reactions to flooding that occurred in their home or surrounding area. However, there were four cases whose symptoms were believed to be caused by flooding at their places of employment. Two (50%) of these four were teachers,

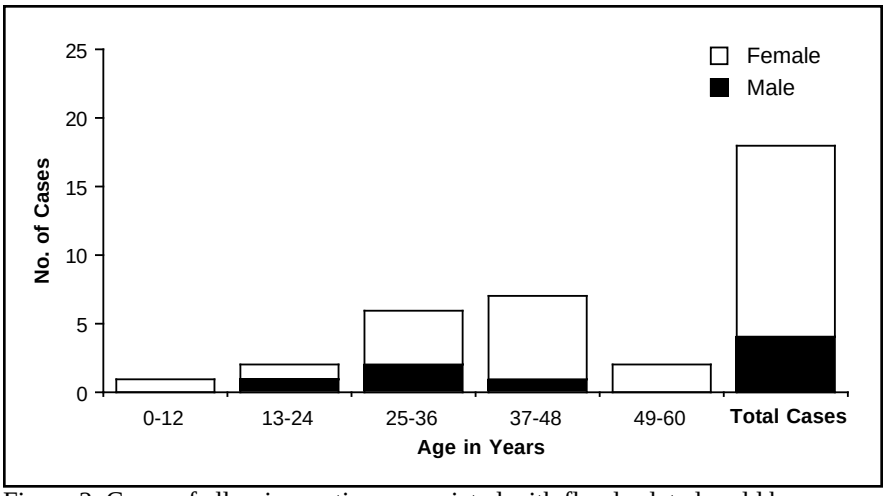

Figure 2. Cases of allergic reactions associated with flood-related mold by age and sex, Missouri, July 1, 1993–June 15, 1994.

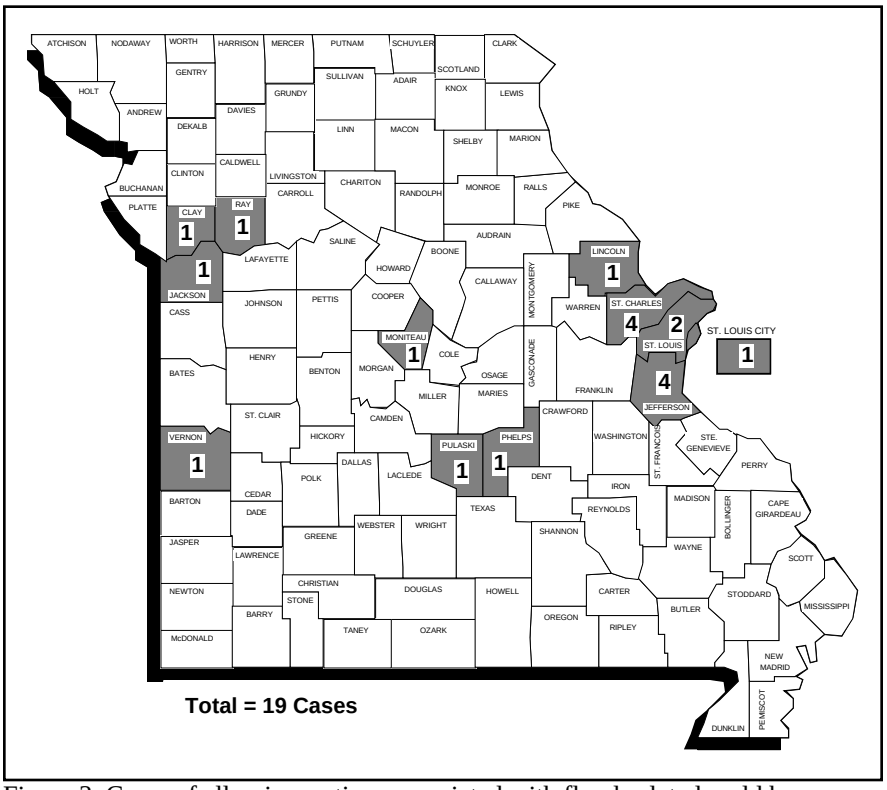

Figure 3. Cases of allergic reactions associated with flood-related mold by county, Missouri, July 1, 1993–June 15, 1994.

who taught in different schools in different areas of the state.

Symptoms ranged from debilitating upper respiratory infections (in two patients) to mild hay fever-like symptoms. These illnesses have affected the livelihood of some of these people. One person had to make a change in work location to relieve the symptoms. The two teachers reported having symptoms at work, but not at home. Another case, whose residence was flooded in September 1993, became very ill with an upper respiratory infection at this time. Symptoms continued after moving into a new home in June 1994, and subsequently persisted through September of that year. Two of the four cases with the most severe symptoms had a preexisting

condition, such as asthma, that appeared to be exacerbated by the mold. There was one report of a possible case which resulted in death, but this could not be confirmed.

One physician cautioned that crop plants can worsen the problem by serving as a source of fungal spores. He had been involved in research in this area, and had found that the levels of spores in farming areas were higher than those in other rural or urban areas.[2]

Conversations with the physicians and 12 (63%) of the 19 cases, indicated that a high level of environmental cleanup had been done. In all cases where residents moved back into flooded homes, appropriate decontamination with chlorine solutions had been accomplished. In other instances, old houses were destroyed and new houses were built.

In summary, results of the study appear to indicate that women, and especially those aged 25 to 48 years, are most likely to be identified as having allergic-type symptoms associated with exposure to flood-related mold. The majority of cases for which date of onset was received had onset shortly after or during flooding. Most cases were found in the St. Louis area in eastern Missouri. Finally, although the small number of cases identified limits the conclusions which can be drawn from this study, the data do point to the existence of allergic illnesses among Missouri residents exposed to mold in flood-affected environments.

Because of the flooding that has been experienced by parts of Missouri in 1995, it is anticipated that more of these health problems will occur. DOH encourages health care professionals to be alert to the possibility of their patient's exposure to flood-related mold, and to recommend that proper cleanup be done. The DOH recommends that buildings which have been subjected to flooding should be stripped of all damaged materials, especially those showing visible mold growth, such as drywalls, paneling, insulation, carpeting and other furnishings. The remainder of the building should be treated with a chlorine bleach solution of one-fourth cup bleach per gallon of water, or other fungicides. Buildings should be allowed to dry out completely and be free of mold before reconstruction begins.

Questions on this subject can be addressed to Scott Clardy at (314) 751-6111 or (800) 392-7245.

REFERENCES:

1. Wedner HJ, Lewis H, Dixit A. Indoor mold aerospora of buildings damaged by the flood of 1993: An impact assessment study. Presented at American Academy of Allergy and Immunology Conference, Anaheim, CA, March 1994.

2. Burge H., Muilenberg M, Chapman J. Crop plants as a source of fungal spores of medical importance. J Allergy Clin Immuno 1986;77:200.

1994-95 Influenza Summary

(continued from page 4)

Figure 4 shows laboratory-confirmed influenza cases by county of residence.

1995-96 Influenza Season

The trivalent influenza vaccine prepared for the 1995–96 season will include A/Texas/36/91-like (H1N1), A/Johannesburg/33/94-like (H3N2) and B/Beijing/184/93-like hemogglutinin antigens. The actual influenza type B strain used by the U.S. manufacturers is B/Harbin/07/94, which is antigenically equivalent to the B/Beijing/184/93 strain.

Recommendations for the use of influenza vaccine for the 1995–96 season can be found on pages 2 and 3 of this issue.

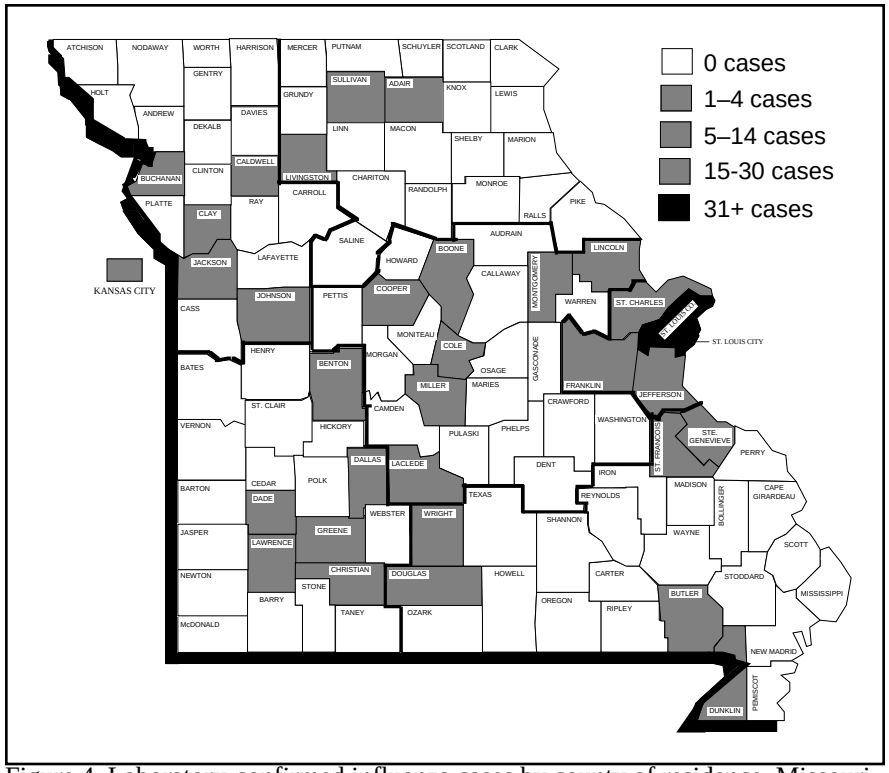

Figure 4. Laboratory-confirmed influenza cases by county of residence, Missouri, 1994/95 season.

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ducing their overall risk from *Cryptosporidium* and other types of infection.

Although data are not sufficient for EPA/CDC to recommend that all severely immunocompromised persons take extra precautions with regard to their drinking water, individuals who wish to take extra measures to avoid waterborne cryptosporidiosis can bring their drinking water to a rolling boil for one minute. Boiling water is the most effective approach for killing *Cryptosporidium*.

As an alternative to boiling water, people may use the following measures:

A point-of-use (personal use, end-of-tap, under-sink) filter—Only point-of-use filters that remove particles one micrometer or less in diameter should be considered. Filters in this category that provide the greatest assurance of *Cryptosporidium* removal include those that use reverse osmosis, those labeled as "Absolute" one micrometer filters or those labeled as certified by the National Sanitation Foundation (NSF) International under Standard 53 for "Cyst Removal." The "Nominal" one micrometer filter rating is not standardized and many filters in this category may not reliably remove *Cryptosporidium*. As with all filters, people should follow the manufacturer's instructions for filter use and replacement. Water treated with a point-of-use filter that meets the above criteria may not necessarily be free of organisms smaller than *Cryptosporidium* that could pose a health hazard for severely immunocompromised persons.

Bottled water—Many, but not all, brands of bottled water may provide a reasonable alternative to boiling tap water. The origin of the source water, the types of microorganisms in that water and the treatment of that water before it is bottled vary considerably among bottled water companies and even among brands of water produced by the same company. Therefore, individuals should not presume that all bottled waters are absolutely free of *Cryptosporidium*. Bottled waters derived from protected well and protected spring water sources are less likely to be contaminated by *Cryptosporidium* than bottled waters containing municipal drinking water derived from less protected sources such as rivers and lakes. Any bottled water treated by distillation or reverse osmosis before bottling assures *Cryptosporidium* removal. Water passed through a commercial filter that meets the above criteria for a point-of-use device before bottling will provide nearly the same level of *Cryptosporidium* removal as distillation or reverse osmosis. Bottled waters meeting the above criteria may not necessarily be free of organisms other than *Cryptosporidium* that could pose a health hazard for severely immunocompromised persons.

Neither EPA nor CDC maintains a list of point-of-use filters or bottled water brands that meet the above criteria. NSF International can provide a list of filters that meet the NSF criteria. Their address is: National Sanitation Foundation International, 3475 Plymouth Road, P.O. Box 130140, Ann Arbor, Michigan 48113-0140; Ph: (800) NSF-8010. Individuals who contact bottlers or filter manufacturers for information should request data supporting claims that a brand of bottled water or filter can meet the above criteria.

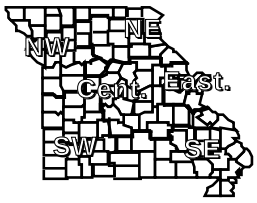
Further Information

When an outbreak of waterborne cryptosporidiosis is recognized and is determined to be ongoing, officials of the public health department and/or the water utility will normally issue a "boil water" notice to protect both the general public and the immunocompromised.

Current testing methods cannot determine with certainty whether *Cryptosporidium* detected in drinking waters is alive or whether it can infect humans. In addition, the current method often requires several days to get results, by which time the tested water has already been used by the public and is no longer in the community's water pipes.

Severely immunocompromised persons may face a variety of health risks. Depending on their illness and circumstances, a response by such individuals that focuses too specifically on one health risk may decrease the amount of attention that should be given to other risks. Health care providers can assist severely immunocompromised persons in weighing these risks and applying this guidance.

On-line access to a database of reported communicable diseases without patient identifiers is now available through the Department of Health's computer bulletin board system. More details can be found on page 18 of this issue.



Missouri Department of Health
Division of Environmental Health and Epidemiology
BIMONTHLY MORBIDITY REPORT

Reporting Period *
May - June, 1995

	Districts							KANSAS CITY	ST. LOUIS CITY	ST. LOUIS CO.	SPGFLD GREENE CO.	2 MONTH STATE TOTALS		CUMULATIVE		
	** NW	NE	CD	SE	** SW	** ED	*** OTHER					1995	1994	FOR 1995	FOR 1994	5 YR MEDIAN
Vaccine Preventable Dis.																
Chickenpox	368	131	208	277	209	0		0	0	1	3	1197	2184	5402	7842	7292
Diphtheria	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Hib Meningitis	0	0	0	0	0	0		0	0	0	0	0	1	4	4	9
Hib Other Invasive	0	0	0	0	0	0		0	0	1	0	1	4	8	25	25
Influenza	0	1	0	0	0	0		0	0	0	0	1	0	301	163	163
Measles	0	0	0	0	0	0		0	0	0	0	0	118	1	160	1
Mumps	0	0	1	0	1	0		1	1	0	1	5	13	16	25	24
Pertussis	3	1	0	1	0	0		0	0	1	0	6	6	16	17	25
Polio	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Rubella	0	0	0	0	0	0		0	0	0	0	0	2	0	2	1
Tetanus	0	0	0	0	0	0		0	0	0	0	0	0	1	0	0
Viral Hepatitis																
A	120	8	47	4	26	11		35	21	10	3	285	72	594	228	351
B	12	0	2	3	7	2		4	32	3	4	69	70	217	228	249
Non A - Non B	5	0	1	0	1	0		0	0	3	1	11	4	34	8	24
Unspecified	0	0	0	0	0	0		0	0	0	0	0	0	0	0	6
Meningitis																
Aseptic	5	3	1	0	6	1		3	0	2	10	31	22	53	61	61
Meningococcal	1	0	2	1	1	1		1	2	2	0	11	2	30	29	28
Enteric Infections																
Campylobacter	13	5	9	11	17	8		11	9	36	16	135	145	255	270	253
Salmonella	7	6	15	12	5	9		4	4	12	5	79	105	185	214	204
Shigella	48	0	64	1	11	18		17	8	38	1	206	56	451	180	180
Typhoid Fever	0	0	0	0	0	0		0	0	0	0	0	1	0	1	1
Parasitic Infections																
Amebiasis	0	0	0	0	0	0		0	2	0	1	3	7	6	18	11
Giardiasis	5	2	20	3	8	5		1	10	7	4	65	95	227	248	267
Sexually Transmitted Dis.																
AIDS	8	1	6	4	5	6	3	29	39	22	3	126	134	333	397	298
Gonorrhea	59	21	82	58	40	14		494	636	281		1685	2136	5730	5830	7032
Genital Herpes	52	17	47	38	72	43		108	112	195		684	657	1838	1816	1763
Nongonoc. urethritis	15	4	20	19	6	22		285	747	540	4	1662	964	4181	3002	3572
Prim. & Sec. syphilis	0	0	0	1	0	0		8	85	31		125	168	346	536	504
Tuberculosis																
Extrapulmonary	1	0	1	1	0	0	0	2	2	1	1	9	10	21	21	18
Pulmonary	1	1	3	10	7	2	0	5	3	5	0	37	46	93	103	103
Zoonotic																
Animal Bites	146	33	51	149	83	0		0	0	480	3	945	1051	2750	2642	2949
Psittacosis	0	0	0	0	0	0		0	0	0	0	0	1	0	2	0
Rabies (Animal)	0	0	0	4	1	0		0	1	0	0	6	4	18	10	9
Rocky Mtn. Sp. Fever	1	0	1	1	1	0		1	0	0	0	5	4	6	4	8
Tularemia	0	2	0	1	3	0		0	0	2	0	8	6	9	8	13

TEAR OUT FOR FUTURE REFERENCE

Low Frequency Diseases

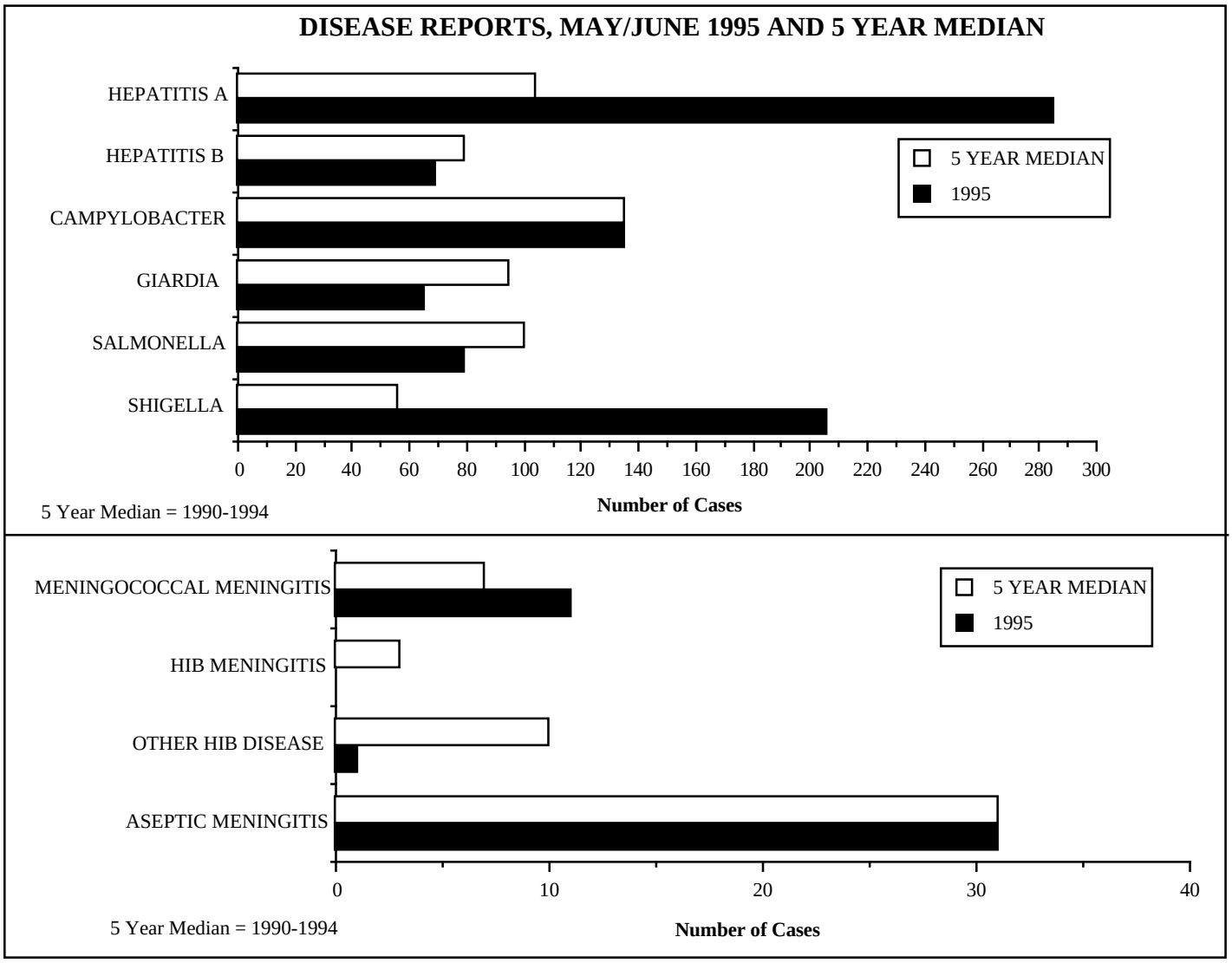
Anthrax
Botulism
Brucellosis
Chancroid
Cholera
Cryptosporidiosis
Encephalitis (infectious)
Encephalitis (viral/arbo-viral)
Granuloma Inguinale
Kawasaki Disease - 1
Legionellosis - 9
Leptospirosis
Lymphogranuloma Venereum
Malaria - 1
Plague
Rabies (human)
Reye's Syndrome
Rheumatic fever, acute
Toxic Shock Syndrome
Trichinosis

Outbreaks

Foodborne - 6
Waterborne
Nosocomial
Pediculosis
Scabies
Other
Hepatitis A - 2
Shigella - 2

*Reporting Period Beginning April 30, Ending July 1, 1995.
**Totals do not include KC, SLC, SLCo, or Springfield
***State and Federal Institutions

Due to data editing, totals may change.



VIRAL HEPATITIS

Hepatitis A trends continue as the May/June 1995 bimonthly period showed an increase of 295.8% in the number of cases, from 72 cases during May/June 1994 to 285 cases during May/June 1995. This is 174.0% above the five year bimonthly median of 104 cases. Hepatitis B cases were essentially the same - 70 in 1994 and 69 in 1995. Hepatitis B is 12.7% below the five year bimonthly median for May/June of 79 cases.

ENTERICS

Campylobacter decreased slightly from 1994 to 1995. It fell 6.9% from 145 cases to 135 cases during the May/June bimonthly time period. There was no change from the five year median of 135 cases. Salmonella, at 79 cases, has fallen 24.8% from 105 cases in 1994. This is 21.0% below the five year median of 100 cases. The increase in hepatitis A noticed earlier, is also seen in shigellosis which increased dramatically by 267.9% from 56 cases in 1994 to 206 cases in 1995. The five year median is also 56 cases.

PARASITES

Giardiasis fell by 31.6% from 95 cases during the 1994 bimonthly period to 65 in 1995. The five year median is 95 cases.

MENINGITIS

Aseptic meningitis increased by 40.9% from 22 cases in 1994 to 31 cases in 1994 bimonthly time period. This is no change from the five year median of 31 cases. Meningococcal meningitis rose by 450.0% from 2 cases in 1994 to 11 cases in 1995, a rise of 57.1% from the five year median of 7 cases.

HIB DISEASE

No cases of Hib meningitis were reported for the period in 1995 and one in 1994. Other invasive Hib disease decreased from 4 cases in 1994 to 1 case in 1995. Other invasive Hib disease was made reportable in 1990 and there is now a May/June bimonthly five year median for other invasive Hib disease. Other invasive Hib disease fell by 90.0% from the bimonthly five year median of 10 cases.

MISSOURI DEPARTMENT OF HEALTH DISEASE CASE REPORT

TELEPHONE _____ or 1/800-392-0272

For Consultation or Information

All diseases listed below are to be reported promptly to the local public health agency or the Missouri Department of Health. The diseases printed in boldface below must be reported immediately by lelephone or tax. Any enteric disease or hepatitis A in a foodhandler, health care worker, day care or correctional facility must be reported immediately by telephone. Other diseases/conditions should be reported within 3 days of first knowledge or suspicion.

Follow-up epidemiologic information may be requested by local or state public health officials.

(Legal authorization: RSMo 192.006 and 192.020; 19 CSR 20-20.020 and 19 CSR 20-080; local statutes and ordinances).

REPORTABLE DISEASES IN MISSOURI

Outbreaks: suspected outbreaks of reportable diseases, other acute or occupationally-related diseases or conditions

AIDS/HIV:
- AIDS
- HIV seropositivity (confirmed)
- T-Helper (CD4+) lymphocyte count on any person with HIV infection

Animal bites
Anthrax
Aseptic meningitis
Botulism
Brucellosis
Chancroid
Diphtheria
Encephalitis, post infectious
Encephalitis, primary
Environmental/Occupational Conditions
- Acute chemical poisoning
- Carbon monoxide poisoning
- Heavy metal poisoning (lead, mercury, arsenic, cadmium and other)
- Hyperthermia
- Hypothermia
- Lead exposure
- Methemoglobinemia
- Occupational lung diseases
- Pesticide poisoning
- Respiratory diseaes triggered by environmental contaminants

Haemophilus intiuenzae disease, invasive, including meningitis
Kawasaki disease
Legionellosis
Leptospirosis
Lyme disease
Malaria
Measles
Meningococcal disease, invasive, including meningilis
Mumps
Nosocomial outbreaks
Pertussis
Plague
Poliomyelitis
Psittacosis
Rabies
Reye syndrome
Rocky Mountain spotted fever
Rubella
Tetanus
Toxic shock syndrome
Tularemia

SECTION D

SEXUALLY TRANSMITTED DISEASES:
- Chancroid
- Chlamydia trachomatis infections
- Gonorrhea
- **Syphilis**

SECTION E

ENTERIC AND PARASITIC DISEASES AND HEPATITIS A
- Amebiasis
- Campylobacter infections
- Cholera
- E.coli 0157:H7
- Giardiasis
- **Hepatitis A**
- Listeria monocytogenes
- Salmonella infections
- Shigella infections
- Trichinosis
- **Typhoid fever**
- Yersinia enterocolitica

SECTION F

HEPATITIS:
- **Hepatitis A**
- Hepatitis B
- Hepatitis B surface antigen (HBsAg) positive, pregnant women only
- Hepatitis non-A, non-B

SECTION G

TUBERCULOSIS:
- TB disease
- TB infection
- Disease from mycobacteria other than tuberculosis

Use Forms CDC 50.42A AND MO **580-164t for AIDS/HIV.**

MISSOURI DEPARTMENT OF HEALTH

DISEASE CASE REPORT

(INSTRUCTIONS ON REVERSE SIDE)

REPORT TO LOCAL PUBLIC HEALTH AGENCY

DATE RECEIVED BY LOCAL HEALTH AGENCY

A. CASE IDENTIFICATION (ALL DISEASES)

NAME (LAST, FIRST, M I) | DATE OF BIRTH (MO/DAY/YR) | AGE | TELEPHONE NUMBER ( )

ADDRESS (STREET OR RFD, CITY, STATE, ZIP CODE) | MEDICAL RECORD NUMBER | GENDER ☐ M ☐ F

COUNTY OF RESIDENCE | PATIENT DIED OF THIS ILLNESS ☐ YES ☐ NO | PARENT OR GUARDIAN IF A MINOR

PATIENT EMPLOYED? ☐ YES ☐ NO | SCHOOL/DAY CARE/WORKPLACE AND OCCUPATION | ETHNIC ORIGIN ☐ HISPANIC ☐ NOT HISPANIC

RACE ☐ BLACK ☐ ASIAN/PACIFIC ISLANDER ☐ MIXED ☐ WH ITE ☐ AMERICAN INDIAN ☐ OTHER (SPECIFY) _____ | PATIENT'S COUNTRY OF ORIGIN | DATE ARRIVED IN U S A

WAS PATIENT HOSPITALIZED? ☐ YES ☐ NO | ARRIVED BY AMBULANCE? ☐ YES ☐ NO | OTHER CASES? ☐ YES ☐ NO ☐ UNKNOWN

RESIDE IN NURSING HOME? ☐ YES ☐ NO | NOSOCOMIAL INFECTION? ☐ YES ☐ NO

NAME OF HOSPITAL/NURSING HOME | ADDRESS

B. PERSON OR AGENCY REPORTING

NAME | DATE OF REPORT (MO/DAY/YR) | TELEPHONE NUMBER ( )

ADDRESS | ☐ PHYSICIAN ☐ OUTPATIENT CLINIC ☐ LABORATORY ☐ HOSPITAL ☐ PUBLIC HEALTH CLINIC ☐ SCHOOL

ATTENDING PHYSICIAN NAME | ADDRESS | TELEPHONE NUMBER ( )

C. DISEASE

DISEASE | PLEASE INCLUDE CONFIRMATORY LABORATORY DATA (ATTACH COPY IF AVAILABLE) DATES TYPE OF TEST RESULT LAB NAME/LOCATION

DATE OF ONSET (MO/DAY/YR) | DATE OF DIAGNOSIS (MO/DAY/YR) | LEAD ☐ VENOUS ☐ CAP | COMMENTS

PLEASE COMPLETE THE APPROPRIATE SECTION FOR THE DISEASE BEING REPORTED

D. SYPHILIS

- ☐ PRIMARY (CHANCRE PRESENT)
- ☐ SECONDARY (SKIN LESIONS, RASH, ETC
- ☐ EARLY LATENT (ASYMPTOMATIC LESS THAN 1 YEAR)
- ☐ LATE LATENT (OVER 1 YEAR DURATION)
- ☐ NEUROSYPHILIS
- ☐ CARDIOVASCULAR
- ☐ CONGENITAL
- ☐ OTHER

☐ GONORRHEA ☐ CHLAMYDIA

(CHECK ABOVE BOXES AS APPROPRIATE)

- ☐ ASYMPTOMATIC
- ☐ UNCOMPLICATED UROGENITAL (URETHRITIS, CERVICITIS)
- ☐ SALPINGITIS (PID)
- ☐ OPHTHALMIA/CONJUNCTIVITIS
- ☐ OTHER (ARTHRITIS, SKIN LESIONS, ETC)

DATE	TEST	RESULTS

TREATMENT NOT INDICATED BECAUSE.
☐ PREVIOUS ADEQ. TREATMENT ☐ FALSE POSITIVE
DATE OF PREVIOUS TREATMENT: _____
PREV. DISEASE/STAGE
PLACE:

HAS PATIENT BEEN TREATED? ☐ YES ☐ NO

DATE(S) OF TREATMENT

TYPE AND AMOUNT OF TREATMENT

E. ENTERIC AND PARASITIC DISEASES AND HEPATITIS A

CHECK BELOW IF PATIENT OR MEMBER OF PATIENT'S HOUSEHOLD (HHLD):	PATIENT YES	PATIENT NO	PATIENT UNK	HHLD MEMBER YES	HHLD MEMBER NO	HHLD MEMBER UNK
IS A FOOD HANDLER	☐	☐	☐	☐	☐	☐
ATTENDS OR WORKS AT A DAY CARE CENTER	☐	☐	☐	☐	☐	☐
IS A HEALTH CARE WORKER	☐	☐	☐	☐	☐	☐

TREATMENT

DRUG

DOSAGE

☐ NO TREATMENT

F. HEPATITIS ☐ A ☐ B ☐ C ☐ PRENATAL ☐ OTHER

(CHECK ALL TESTS PERFORMED)

JAUNDICED: ☐ YES ☐ NO

JAUNDICE ONSET DATE _____

CARRIER? ☐ YES ☐ NO

ALT | AST

TEST	POS	NEG
HAV-IgM	☐	☐
HBcAb-IgM	☐	☐
H BsAg	☐	☐
H BsAb	☐	☐
HBcAb	☐	☐
Hep C	☐	☐

G. ☐ DISEASE OR ☐ INFECTION

TUBERCULIN TEST (DATE)

RESULTS (MM INDURATION)

TYPE OF TEST (CHECK ONE)
- ☐ MANTOUX (5TU-PPD)
- ☐ MULTIPLE PUNCTURE DEVICE
- ☐ NOT DONE

X-RAY
- ☐ NORMAL (DATE) _____
- ☐ ABNORMAL (DATE) _____

(CHECK ONE)
- ☐ STABLE
- ☐ WORSENING
- ☐ IMPROVING
- ☐ NOT DONE
- ☐ UNKNOWN
- ☐ CAVITARY
- ☐ NONCAVITARY

PREVIOUS TB DISEASE
☐ YES ☐ NO ☐ UNK

BACTERIOLOGY

TYPE OF SPECIMEN

	POS	NEG	PEND
SMEAR (DATE) _____	☐	☐	☐
CULTURE (DATE) _____	☐	☐	☐

REPORT DATE _____
☐ NOT STATED OR UNKNOWN ☐ NOT DONE
IF CULTURE POSITIVE:
☐ M TUBERCULOSIS
☐ ATYPICAL MYCOBACTERIA (SPECIFY)_____

TREATMENT	DOSAGE
☐ ISONIAZID	
☐ ETHAMBUTOL	
☐ PYRAZINAMIDE	
☐ RIFAMPIN	
☐ OTHER (SPECIFY)	

DATE TREATMENT STARTED

Tuberculosis in Pacific Island College Students in Missouri, 1994–95

Marty Huber, R.N., M.P.H.
Bureau of Tuberculosis Control

Since May 1994, the Missouri Department of Health has identified one presumptive and three confirmed cases of tuberculosis among students from adjacent Pacific Islands attending Missouri colleges and universities. Contact investigation for the index case was delayed due to lack of timely and complete reporting of the case to the Department of Health. Compounding the problem was the lack of a student health service or an identified health care provider for students in the small college where two of the cases were students. The index case had been symptomatic for at least two months before returning to his island home and being diagnosed with tuberculosis.

The second case, his girlfriend, came to light two months after the index case was reported to the Department of Health, and six months after he was diagnosed. She attended a large state university two hours away from the college of the index case. The third case was identified one month later when she became symptomatic. She attended the same small college as the index case and was a good friend. The fourth case was identified by the third case, as a friend with tuberculosis in another large state university. The local health department had not reported the case because there had not been a positive culture and a definite diagnosis of tuberculosis had not been made despite a multi-drug, anti-tuberculosis regimen prescribed for six months. The index case had pulmonary tuberculosis, the second and third cases had pulmonary and lymphatic tuberculosis and the fourth case had pleural tuberculosis.

Case Reports

Case 1 (Index Case): A 22-year-old male, who was identified as a contact to infectious tuberculosis in his island home in 1991 while attending a junior college on the island. There is no documentation that he was placed on Isoniazid (INH) preventive treatment at that time in accordance with recommendations from the Centers for Disease Control and Prevention (CDC) and the American Thoracic Society. In autumn of 1992, he transferred to a small college in Missouri. The college has no student health service, requires no pre-admission medical evaluation and keeps no health information on any of its students. There are no arrangements for health care for students. The student remained in Missouri for most of his vacation periods. He was very active in social activities and was a member of a dancing group which performed at other Missouri colleges and universities. He was a member of the National Guard and flew on military aircraft to another state for training in February 1994.

On April 10, 1994, he went to the local hospital emergency room with what was characterized as an "allergic reaction." He was kept in intensive care for approximately six hours. On April 13, he went to a local physician with symptoms of fever, night sweats, cough, weight loss, jaundice and an enlarged liver. He had a "tine" tuberculin test in the doctor's office, which was read as negative. A chest x-ray was read as "essentially normal, but with some inflammation in the right lower lobe." The diagnosis was acute hepatitis. All hepatitis tests were negative, as were tests for mononucleosis and HIV. On April 20 and 27, he was seen again by the local physician for follow-up for hepatitis, with notes only that the jaundice was gradually clearing. Final diagnosis was acute hepatitis, etiology unknown.

After the end of the semester, on May 20, 1994, he flew home, although he was so ill with the above systemic and respiratory symptoms on the way to the airport that there was concern that he would not be able to travel. A day or so later, he was admitted to a hospital on his home island, then airlifted to Hawaii, where his sputum was determined to be acid-fast bacilli (AFB) smear positive. He was placed on anti-tuberculosis medications and sent home with the diagnosis of presumptive tuberculosis. The Hawaii Department of Health was notified only after the culture grew out *Mycobacterium tuberculosis*, and after he had returned to his home, so no interviewing for contact identification was possible.

On September 20, 1994, the Missouri Bureau of Tuberculosis Control was notified that he had attended college in Missouri. No contacts were identified. The local health department requested more information from Hawaii regarding his campus residence, classes and activities. There was no reply until January 9, 1995, because the Hawaii Department of Health did not have the information and follow-up was not done.

Case 2: A 22-year-old female student, who presented on November 28, 1994 to the student health center at a large state university in Missouri with cervical lymphadenopathy. The tuberculin skin test (TST) by the Mantoux method showed 24 mm. induration. She stated that her TST two years previously had been "negative." The chest x-ray was reported as "Right upper and middle lobe infiltrates." The cervical node aspirate was AFB smear positive. A bronchoscopy was performed; the bronchial wash specimen was reported as AFB smear negative.

She stated that her boyfriend (the index case) had been hospitalized in Hawaii for tuberculosis in the summer of 1994, and she had helped take care of him while he was sick in Missouri in the spring of 1994. She was isolated in a

(continued on page 14)

(continued from page 13)
motel room for two weeks of anti-tuberculosis medications prior to being released to fly home for semester break with a supply of anti-tuberculosis drugs. The island health department was notified of her arrival and presumptive tuberculosis status. On December 27, 1994, the bronchial wash specimen was reported as culture positive for *Mycobacterium tuberculosis.*

Case 3: A 20-year-old female student at the same college as the index case, who presented to a county health department primary care clinic on January 20, 1995 with a large cervical mass, present since January 11. Her TST was 20 mm. and the chest x-ray showed "pulmonary tuberculosis." The cervical node aspirate was AFB smear positive. She was unable to produce sputum, and no sputum induction facility was available. She had a baby, born in November 1994, who she was breastfeeding. The primary care physician hesitated to place her on anti-tuberculosis medications due to breastfeeding, and recommended that she wean the baby before instituting treatment.

She was a close friend of the index case, and stated that she had another friend in another large state university who was being treated for tuberculosis. After consultation with CDC regarding the safety of breastfeeding while taking anti-tuberculosis drugs, treatment was started on February 3 without weaning the baby. A spontaneously produced sputum specimen was collected on that day and sent to a commercial laboratory. This specimen was reported as AFB smear negative. A month later the isolate cultured from this specimen was sent to the Missouri Tuberculosis Reference Laboratory for identification and was reported on March 6 to be *Mycobacterium tuberculosis*.

Case 4: The Bureau of Tuberculosis Control contacted a third county health department regarding the report from Case 3 that a Pacific Island college student was being treated for tuberculosis. The 23-year-old female student had presented to the local hospital emergency room on September 16, 1994 with dyspnea, nonproductive cough and sharp inspiratory chest pain. Her TST was 15 mm. The chest x-ray showed a large pleural effusion. Thoracentesis produced 2300 ml., which was AFB smear and culture negative, as was the sputum specimen. Anti-tuberculosis drugs were started on September 21, but the case was not reported to the Bureau of Tuberculosis Control because the physician had not stated that the diagnosis was "tuberculosis." The case reported visiting a hospitalized male friend who had tuberculosis (the index case) in Hawaii in the summer of 1994.

Results of Contact Investigation

Case 1: Discrete inquiries at the college eventually identified contacts in four groups: school (4 classes), National Guard, social contacts and the local hospital ER and ICU. A total of 134 contacts (excluding the other three cases) were skin tested and read; 25 (18.7%) were infected with TST reactions ranging from 5–28 mm. induration. Of particular note, was that 56 percent of his social contacts were infected, many of whom were Pacific Islanders.

Case 2: A total of 36 contacts were identified, tested and read; three (8.3%) were infected.

Case 3: This case caused much concern because she was breastfeeding her baby, and because she shared a home with two other mothers of infants and children. Among the household members, only the housemate who was a Pacific Islander and was also a good friend of the index case, had a positive TST at the time of the initial contact examination. All household members were placed on INH preventive treatment immediately regardless of TST reading. This was done for two reasons:

- There is an "incubation" period of two to ten weeks after tuberculosis infection has occurred before the TST gives a true response.
- It is thought that INH preventive treatment can prevent infection from occurring in high risk situations.

A total of 19 contacts to Case 3 were tested and read; two (10.5%) were infected. (None of the mutual contacts with Case 1 were included in the analysis of contact investigation for Case 3.)

Case 4: No contact investigation was done because she had extrapulmonary (pleural) tuberculosis. Only persons with pulmonary and laryngeal tuberculosis disease are considered to be infectious to others.

Discussion

The index case is considered to be the source case for the three other students, although the incidence of tuberculosis in the islands is very high and it is possible that many of the students from the islands were already infected with tuberculosis before coming to Missouri. The 1993 case rate was 44.5/100,000 for Asian/Pacific Islanders compared to 9.8 for all race/ethnic groups in the United States. Since the prior tuberculin status of the students is unknown, it may not be accurate to name him as the source case for the other three cases or the tuberculosis infections in the other Pacific Island college students.

Contact investigation discovered 30 other infected persons. The contacts of the index case, including the three other cases, represent an infection rate of 20.4 percent (28/137). The infection rate for Case 2 was 8.3 percent (3/36) and for Case 3 was 10.5 percent (2/19).

Outbreak analysis reveals many missed opportunities for early intervention and prevention. Preventive treatment given to the index case when he was identified as a contact would have protected against progression from tuberculosis infection to tuberculosis disease. Requiring TST results for all college students from areas of high incidence of tuberculosis would identify those with tuberculosis infection who would benefit from pre-

ventive treatment. A higher index of suspicion for tuberculosis when signs and symptoms indicate would allow for early identification and treatment, thereby reducing the risk of transmission of tuberculosis to others. Use of the Mantoux PPD TST would prevent the confusion of potential false positive and false negative results from the "tine" test. Sputum induction facilities should be available locally for more rapid identification of infectious tuberculosis. All specimens for AFB should be sent to the Missouri Tuberculosis Reference Laboratory for improved quality of testing and more rapid identification.

More rapid reporting of tuberculosis infection and disease to health departments would allow for more thorough contact identification and examination and aid in identifying an outbreak situation. More communication between the various health departments, with follow-up on missing information, would have helped in understanding the scope of the outbreak. It is important to maintain the confidentiality of persons with tuberculosis. However, in the situation of the index case, with no self-identified contacts, it became necessary to enlist the aid of one college staff person to obtain class rolls and household contacts. If this had been done at the time of the initial notification in September 1994, it could perhaps have prevented Cases 2 and 3. More willingness to consult with a tuberculosis treatment expert rather than waiting to diagnose and start anti-tuberculosis drugs would reduce the risk of transmission to others. Questioning the health care provider regarding the presumptive diagnosis when anti-tuberculosis drugs were started would have allowed for earlier reporting of the case and alerted the Bureau of Tuberculosis Control to the potential outbreak situation. Closer review of the monthly pharmacy records by the Bureau of Tuberculosis Control and comparison with reported cases would have discovered that Case 4 was being treated for tuberculosis and had not been reported as a tuberculosis case several months earlier.

(continued on page 17)

State Public Health Laboratory Report

Newborn Screening — Hypothyroidism, Phenylketonuria, Galactosemia and Hemoglobinopathies

James Baumgartner, B.S., M.B.A., Chief, Metabolic Disease Unit

	Mar 95	Apr 95	Total YTD
Specimens Tested	10,096	9,050	38,426
Initial (percent)	62.9%	63.6%	24,379
Repeat (percent)	37.1%	36.4%	14,047
Specimens: Unsatisfactory	150	102	585
HT Borderline	909	659	3,460
HT Presumptive	32	21	159
PKU Borderline	27	11	88
PKU Presumptive Positive	1	1	4
GAL Borderline	56	77	256
GAL Presumptive Positive	3	1	8
FAS (Sickle cell trait)	86	58	307
FAC (Hb C trait)	27	16	93
FAX (Hb variant)	9	8	45
FS (Sickle cell disease)	2	1	5
FSC (Sickle C disease)	1	0	3
FC (Hb C disease)	1	0	4

	May 95	Jun 95	Total YTD
Specimens Tested	10,448	10,281	59,155
Initial (percent)	64.4%	62.2%	37,500
Repeat (percent)	35.6%	37.8%	21,655
Specimens: Unsatisfactory	158	141	884
HT Borderline	751	801	5,012
HT Presumptive	25	29	213
PKU Borderline	29	12	129
PKU Presumptive Positive	2	2	8
GAL Borderline	189	245	690
GAL Presumptive Positive	1	5	14
FAS (Sickle cell trait)	93	86	486
FAC (Hb C trait)	24	15	132
FAX (Hb variant)	13	12	70
FS (Sickle cell disease)	3	2	10
FSC (Sickle C disease)	2	1	6
FC (Hb C disease)	0	0	4

HT = Hypothyroidism, PKU = Phenylketonuria, GAL = Galactosemia, Hb = Hemoglobin, YTD = Year to Date

Immunization Levels in Missouri's Public Clinics

Marilyn Kemna
Bureau of Immunization

The state of Missouri, as well as other states in the nation, have set a goal to achieve at least 90 percent immunization levels for children 2 years of age by 1996 for the critical doses in the vaccination series, including: measles, mumps and rubella (MMR); oral polio vaccine (OPV); diphtheria, tetanus and pertussis (DTP); and *Haemophilus influenzae* b (Hib).

According to results from the 1994 Public Clinic Immunization Assessment Survey conducted by the Bureau of Immunization, 60.6 percent of children served by Missouri's city and county health agencies are appropriately immunized by their second birthday. For this survey, appropriately immunized criteria included a minimum of four DTP, three OPV, and one MMR by 24 months of age. This primary series has been used since the bureau began conducting the survey in 1992 and, thus, allows year-to-year comparisons. However, levels for the other vaccines were also determined.

Since initiating the survey in 1992, the Bureau of Immunization has reported the survey results as an unweighted average, calculated by simply dividing the total number of records showing complete immunization at 24 months of age by the total number of records for children 24 months of age served by public clinics. However, this methodology was revised to reflect a more statistically accurate statewide average based upon weighted results. The weighted statewide average is 60.6 percent as compared to the originally reported unweighted statewide average of 65.9 percent.

During the period December 1994 through March 1995, immunization staff conducted on-site clinic assessments of the immunization records for children 2 years of age served by public health

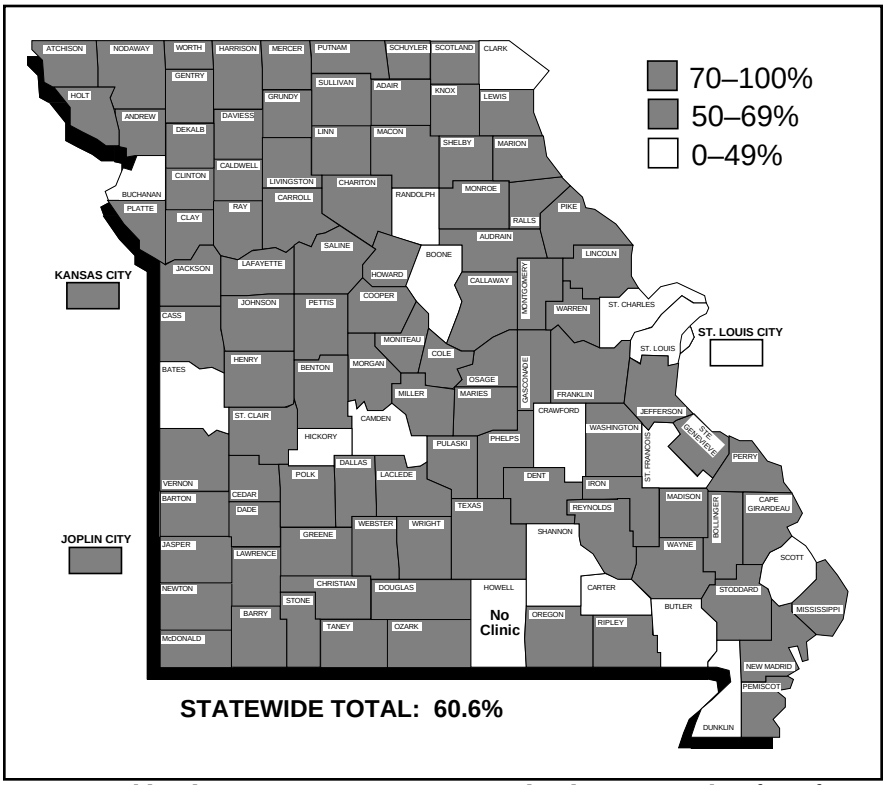


Figure 1. Public clinic immunization assessment levels at 24 months of age for primary series (4 DTP, 3 OPV, 1 MMR), Missouri, 1994.

Table 1. Public Clinic Assessment Survey Results, Missouri, 1994

Vaccine	Percent Immunized at 24 Months of Age
4 DTP, 3 OPV, 1 MMR	60.6%
4 DTP, 3 OPV, 3 Hib, 1 MMR	60.0%
4 DTP, 3 OPV, 3 Hib, 3 HB, 1 MMR	15.8%
3 DTP, 3 OPV, 1 MMR	68.9%
4 DTP	62.1%
3 OPV	71.5%
1 MMR	79.5%
3 Hib	84.9%
3 HB	20.9%

DTP = Diphtheria, tetanus and pertussis
Hib = *Haemophilus influenzae* b
HB = Hepatitis B
MMR = Measles, mumps and rubella
OPV = Oral polio vaccine

agencies. Two years of age was defined as those children born between December 1, 1991 and November 30, 1992. Randomized sampling surveys were conducted following guidelines established by the Centers for Disease Control and Prevention. Of the 30,333 children served by public clinics in Missouri, 44.5 percent (13,486 children) were included in the survey.

The percentage of children appropriately immunized for the primary series ranged from a high of 97.3 percent to a low of 25.6 percent. Each county has been ranked based upon their immunization levels. These rankings are presented in three percentage groupings in Figure 1.

Percentages were also calculated for completing other series (4 DTP, 3 OPV, 3 Hib, 1 MMR; and 4 DTP, 3 OPV, 3 Hib, 3 HB, 1 MMR), various combinations of vaccines and specific vaccines. The results are provided in Table 1.

This was the third year the Public Clinic Immunization Assessment Survey was conducted. The immunization levels for 2 year old children served by public clinics increased significantly during the three-year time period from 41.6 percent in 1992 to 47.0 percent in 1993 and to 60.6 percent in 1994.

Based upon survey results, five counties have already achieved the national goal of 90 percent immunization levels. These include: Howard (97.3%), Macon (96.9%), Clinton (91.7%), Shelby (91.7%) and, Putnam (91.1%).

In addition, twelve counties increased their levels at least 30 percent from the results reported for last year's survey. These include: Benton, Clinton, Callaway, Cole, Montgomery, Warren, Oregon, Ozark, Ray, Holt, St. Clair (Osceola facility) and Douglas.

Also, noteworthy was the improvement achieved in the Northwest Metro Area, which includes Kansas City and the counties of Jackson, Platte, Cass, Ray and Clay. An increase of 19.4 percent was noted for the area with most improvement accomplished by Ray county, increasing from 42.5 percent in 1993 to 74.5 percent in 1994.

Many of the counties indicated that the improvements were accomplished by reminding parents of upcoming immunization appointments and contacting families when appointments are missed; scheduling immunization clinics concurrently with other services for preschool age children, such as WIC clinics; simultaneously administering all vaccine doses for which a child is eligible during each clinic visit; and extending clinic hours.

Health care providers are encouraged to contact the Bureau of Immunization at (314) 751-6133 or their district immunization representative for assistance in assessing clinic immunization levels or for information concerning the recommended Standards for Pediatric Immunization Practices.

Tuberculosis in College Students

(continued from page 15)

Tuberculosis was thought to be a disease of the past just one short decade ago. However, several factors have severely impacted the anticipated elimination of tuberculosis as a public health problem by the year 2000. These factors include:

- The HIV/AIDS epidemic. Persons who are dually infected with tuberculosis and HIV have an 8–10 percent risk **per year** of developing active tuberculosis disease. Persons who have only tuberculosis infection have a 5–10 percent **lifetime** risk of developing active tuberculosis disease.

- The influx of persons from areas where tuberculosis is endemic (i.e., Southeast Asia, Latin America, Pacific Islands).

- The low incidence of tuberculosis in this country, which results in young health care providers having inadequate experience in methods of tuberculosis control, as well as a low "index of suspicion" for tuberculosis in patients with the classical signs and symptoms of tuberculosis.

- The reduction of funding and relatively low level of knowledge about and appreciation for public health by the American people. In reality, the public health agencies in the United States in the past two centuries have taken the lead in the development of safe water and food supplies, adequate waste disposal, as well as control of communicable diseases and assurance of care for the medically underserved population.

The Missouri Advisory Committee for the Elimination of Tuberculosis (MACET) and the Bureau of Tuberculosis Control have established a goal to reduce by six percent annually the number of new cases of tuberculosis, with a case rate of 3.5/100,000 by the year 2000. The 1994 case rate was 5.0. This goal is achievable, but only if there is close cooperation between public and private health care providers, adequate funding to provide health care services and effective anti-tuberculosis medications to persons with tuberculosis infection and disease, and early identification and reporting of persons with infectious tuberculosis to assure prompt and appropriate isolation and treatment, as well as contact identification, examination and appropriate prophylaxis.

If you have questions, comments or want to obtain the latest literature on tuberculosis, please call the Bureau of Tuberculosis Control at (314) 751-6122.

Communicable Disease Information Available to Doctors and Public Through a Computer Bulletin Board System

Kim Palmer
Bureau of Communicable Disease Control

The Missouri Department of Health has developed a computer bulletin board system (BBS) and a fax system to receive and send documents to health care providers in Missouri.

The BBS is compatible with **any** type of computer system that can utilize a modem, such as Macs, Windows, DOS, UNIX, etc. It will allow medical and public health professionals, as well as the public, to interact with and gain needed information from the Department of Health whenever needed. The BBS will be expanded over time to include information from other programs within the Department of Health. The department is encouraging anyone with a computer and a modem to access the BBS.

The BBS will include an on-line access to a database of reported communicable diseases without patient identifiers. This database will allow physicians, hospitals, laboratories, infection control practitioners and public health professionals to look at colored charts, tables and graphs of diseases in their county, a group of counties or the state. Additionally, the BBS will include features such as: maps, disease forecasts or trends, health news and commentary, electronic mail and public health alerts.

The fax system is a complement to the BBS and is designed to provide many of the same documents to individuals without modems. A fax-on-demand environment has been developed to supply documents to anyone with a touch tone phone and a fax number. This system will concentrate on tables, maps and one page text documents. The department is dedicating one phone line for the fax system. The statewide fax number is (800) 210-6225, and the local (Jefferson City area) fax number is (314) 526-7712. Some features of the BBS will not be available through the fax system.

The BBS is an interim solution until such time as the department can provide full Internet and integrated dial-up access.

Approximately 4,700 questionnaires were mailed on May 31 to physicians across the state informing them of the BBS. To date, we have received over 400 replies. In the questionnaire, physicians were asked to specify which features they would like to have available on the BBS. The results are very encouraging. Almost all physicians replying wanted access to Missouri and United States health statistics, census data for Missouri, electronic mail, disease reports, maps, trend analysis tables, and forecasts. Of particular interest to physicians, was the ability to post messages in specific conference areas and have live, on-line chat or talks with other physicians on the BBS. Several physicians suggested specific functions and/or information that they would also like to see incorporated into the BBS.

The BBS software has potential for 250 simultaneous live-talk (chat) channels. These connections can be network, Internet or direct phone dial-in via a modem connection to one of our 800 numbers. The system will start with three dial-in numbers and additional lines will be added as needed. Two dial-in lines can be accessed by dialing the roll-down 800 number at (800) 213-9723. A local (Jefferson City area) dial-in line is also available at (314) 526-7688.

The live-talk system allows for many callers to set up their own topic areas. These chat areas come in several user-defined options:

Public: Anyone may join in and read or reply to the current conversation.

Semi-public: The creator of the area decides who gets in with no limit on the number of connections.

Private: One-on-one with the creator of the area inviting the other person in.

When invited into these areas, it is up to the invited person to join in or not. A person cannot be forced into a conversation. This is similar to CompuServe's "CB" style areas. Occasionally the department will announce a particular time when a call to the BBS will take place with a well-known professional in a specific field of expertise participating.

A person may also read or leave mail to another particular person or just address it to “ALL” in any one of many mail conferences available on the BBS. In these conferences, an exchange of ideas in public mail form can occur with other professionals. In this manner, one may discuss or track things like non-reportable communicable diseases, antibiotic resistant bacteria, chronic disease conditions and environmental health conditions.

Many physicians have written in with requests for features on the BBS, such as traveler alerts, immunization recommendations and schedules, Department of Health consultation, posting of meeting schedules, live on-line general help, direct electronic reporting of disease conditions to the department and information relating to family planning and reproductive health. We have already implemented several of these features into the BBS and are considering many others.

It is our sincere wish that everyone will find something informative or of interest on the BBS. Please feel free to call in any time. **If you have questions about the BBS, please contact Kim Palmer at (314) 751-6115.**

Use of Varicella Vaccine

Paula A. Rosenberg
Bureau of Immunization

The Recommended Schedule

Merck & Co, Inc., who produces the varicella vaccine, recommends that the vaccine be given to children who are 12 months of age or older. Children between 12 months and 12 years of age should receive a single 0.5 ml. dose administered **subcutaneously** in the anterolateral thigh or deltoid. Those 13 years of age and older should receive a 0.5 ml. dose subcutaneously, with a second 0.5 ml. dose four to eight weeks later.

The American Academy of Pediatrics (AAP) has recently endorsed the schedule established by Merck for the use of varicella vaccine in childhood immunizations. The Advisory Committee on Immunization Practices (ACIP), whose recommendations the Department of Health follows, has not issued recommendations for the use of varicella vaccine. Providers are encouraged to watch for those recommendations as they become available.

Remember, It's a Live Virus Vaccine!

Providers are reminded that the varicella vaccine is a live virus vaccine. Therefore, extra care should be taken when scheduling this vaccine for administration with other vaccines in the childhood immunization schedule. Varicella and other live virus vaccines, such as oral polio (OPV) and measles, mumps, rubella (MMR) vaccines, may be given at the same time. If you are unable to do so, providers must wait at least four weeks between the administration of live vaccines. The vaccine may be given when the patient is on antibiotics, but it is not effective if the patient is also being given antiviral medications. There are no restrictions for giving varicella vaccine when tuberculin skin tesing is in progress.

In addition, precautions must be taken when administering this vaccine and immune globulin preparations. The suggested interval between administration of live vaccines and immune globulin preparations varies depending on the type. For specifics on the timing of live vaccines and immune globulin preparations, providers should consult the General Recommendations on Immunization: Recommendations of the Advisory Committee on Immunization Practices, *Morbidity and Mortality Weekly Report,* January 28, 1994, Vol. 43, No. RR-1.

Anyone with questions regarding the varicella vaccine should contact their district immunization representative or the Bureau of Immunization at (314) 751-6133.

Chickenpox Vaccine: Handle with Care!

The new vaccine for varicella, Varivax®, has recently become available. Many providers are beginning to use this vaccine and should take note of the recommendations for its use.

Varivax®, the recently approved varicella vaccine, has stringent handling guidelines. The following information has been compiled by the Immunization Action Coalition after discussions with Merck, the manufacturer of the vaccine, and the American Academy of Pediatrics, the medical organization that recently recommended routine use of chickenpox vaccine in childhood.

- Make sure that all staff members involved in administering vaccines are trained in the special handling and administration requirements of this new vaccine since it is different from all others.
- **The maximum acceptable temperature for the storage of Varivax® is lower than the maximum acceptable temperature for storage of oral polio vaccine!** Varivax® must be stored at +5˚F (-15˚C) or colder. Any freezer which reliably maintains this temperature is acceptable. Household freezers manufactured within the last 5–10 years are designed to maintain temperatures of +5˚F to -4˚F (-15˚C to -20˚C)
- Stability of Varivax® was specifically tested in a frost-free freezer because the defrost cycle may periodically result in a warmer air temperature in the freezer compartment. The vaccine remained stable under these conditions; thus a reliable frost-free freezer maintains acceptable storage conditions.
- In freezer/refrigerator combination units, where the freezer is a separate sealed and insulated compartment, the same conditions are generally met.
- The units of most concern are the small dormitory-style refrigerators where the ice compartment is either not tightly enclosed, or is enclosed with an unsealed, uninsulated door. These types of freezers may not meet the temperature requirements.
- Regardless of the type of freezer available, Merck recommends that customers verify the temperature of their freezer by placing an appropriate thermometer and checking it daily to ensure that appropriate temperatures are maintained.
- You have only 30 minutes to administer chickenpox vaccine once it has been reconstituted.
- If the reconstituted chickenpox vaccine has not been used within 30 minutes, you must throw it away. Do not refreeze it.
- If you find that you have inadvertently put unreconstituted vaccine vials in the refrigerator or have left them at room temperature, call (800) 9-VARIVAX right away.

Any questions you have regarding Varivax® may be directed to (800) 9-VARIVAX.

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Alternate forms of this publication for persons with disabilities may be obtained by contacting the Missouri Department of Health, Division of Environmental Health and Epidemiology, P.O. Box 570, Jefferson City, MO 65102, (314) 751-6128. TDD users can access the preceding phone number by calling (800) 735-2966.

This newsletter can be recycled.

Department of Health Announces New Disease Reporting Form

The Missouri Department of Health has developed a new, integrated form for reportable disease notification. A copy of the new form can be found on pages 11 and 12 of this issue. The new consolidated CD-1 form streamlines the reporting process, replacing four different forms previously used. It should be used for all reportable diseases and conditions, including sexually transmitted diseases, tuberculosis, other communicable and zoonotic diseases and environmentally induced conditions. The only exceptions are HIV infection and AIDS, which should continue to be reported on forms CDC 50.42A and MO 580-1641. The CD-1L form will continue to be available for laboratory reporting only.

The new form was developed in partnership with the local health agencies and with input from physicians and infection control practitioners. It was designed for ease of use and to encourage reporting by FAX.

The reportable diseases and conditions are listed on the back of the report form. **Diseases in bold print should be reported immediately by telephone.** Reports should be made to the local health department, and supplies of the form may be ordered from them.

Disease reporting information is crucial to community diagnosis and effective disease control. The integrated form should make the reporting process easier. Please take the time to review your system and assure that reporting is done promptly and routinely.

If you need consultation concerning disease reporting, please call your local health department or call the Department of Health at (800) 392-0272.

Missouri EPIDEMIOLOGIST

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Governor Carnahan Calls on Health Department to Raise Immunization Rates

Paula A. Rosenberg
Bureau of Immunization

Recently, the Centers for Disease Control and Prevention (CDC) released the results of the National Immunization Survey (NIS), a telephone survey conducted to determine two-year-old immunization levels. The NIS found Missouri's rates, among both public and private sector patients, aged 19–35 months, to be 64 percent. This rate ties Missouri with the state of Idaho, just above Michigan (61%), which had the lowest rate in the nation. As a result of this survey, Governor Carnahan has called upon the Department of Health to take action to raise these rates in both the public and private sectors to protect Missouri's children.

Creating New Partnerships

Some counties in Missouri have been very successful in achieving high immunization rates. These counties have created systems that involve both the public and private sectors in assuring that every opportunity is taken to immunize children. The Department of Health hopes to assist other communities by forming the Statewide Immunization Advisory Committee to promote private/public collaboration. This committee has representation from all major physicians and nurses associations in the state, as well as the Women, Infants and Children (WIC) Program.

Since half of the immunizations in Missouri are given by private sector physicians, it is vital that they be included in order to raise rates. Private sector physicians will be reached through on-going satellite courses offered through the CDC, as well as one-on-one peer education conducted through physician organizations and local health agencies.

In addition, the WIC Program is being involved since it provides an excellent opportunity to immunize children. WIC staff will be trained to evaluate immunization histories and note deficiencies. Efforts will be made, where possible, to combine the immunization and WIC clinics for easy referral of patients who have fallen behind schedule, or who are ready for their next series of immunizations.

Changing Practices

Missouri's rates are low for a variety of reasons, but it comes down to two major areas: access barriers and missed opportunities.

The public sector clinics see approximately half of Missouri's children. Overcrowding and awkward hours mean that parents often hesitate to take the time to attend these clinics. In addition, referral to the public sector from private offices means additional time parents must take off for well-child visits and immunization visits. This is being addressed through increased funding to allow local health agencies to remain open after hours and on weekends, or to hire additional staff.

Missed opportunities are times when a child presents to a medical provider and the opportunity is missed to fully immunize the child. Phasing out clinic practices such as not administering all vaccines possible at the visit and using false contraindications can raise rates as much as 17 percent. In addition, all immunization providers must use every encounter with a child, during both well- and sick-child visits, to review the immunization record.

Tracking Systems are Vital

When the individual vaccine rates are evaluated, Missouri's rates are comparable to the national average. However, rates for the later doses of the vaccines drop off dramatically, indicating that providers are not tracking their patients and children are not completing the series.

(continued on page 2)

Inside this Issue...

(continued from page 1)
The Department of Health has adopted a computer program called the Missouri Immunization Tracking System (MITS) and will be installing it in local health agencies throughout the state. It should become available in 1996 as public domain software for private physicians. In addition, the St. Louis and Kansas City metropolitan areas have developed regional tracking systems, to be available by the end of 1995, that will allow providers to dial into a central immunization registry. The registry will show all the immunizations given to a particular child by different health-care providers who participate in the system.

This tracking system allows providers to remind parents when immunization visits are coming due and to recall those patients who have failed to come in for an immunization visit.

In order to affect the most change in the least amount of time, the Department of Health plans to focus on 37 high priority counties that have the largest two-year-old populations and/or the lowest rates. All immunization providers, however, will be encouraged to take action to raise rates in their communities. It is only through community-level action that rates can be increased.

Anyone wishing more information regarding immunizations is encouraged to contact their local health agency, their district immunization representative located in each of the district health offices, or the Bureau of Immunization at (314) 751-6133.

REFERENCES:

1. CDC. State and national vaccination coverage levels among children aged 19–35 months–United States, April-December 1994. MMWR 1995;44: 613, 619-23
2. U.S. Department of Health and Human Services, Standards for pediatric immunization practices, Sixth printing, April 1994.

What Can You Do to Raise Immunization Rates?

- Get involved in your community's immunization efforts.
- Use every clinical encounter as a chance to screen and, when indicated, immunize.
- Educate parents and guardians about immunizations in general terms.
- Question parents/guardians thoroughly about contraindications, but follow only **true** contraindications. See table of contraindications on page 3.
- Administer simultaneously all vaccine doses for which a child is eligible at the time of each visit.
- Accurately record the child's complete immunization history, as well as doses given during the visit.
- Provide the parent with a record showing each dose given.
- Operate a tracking system; remind parents of upcoming appointments and recall them if they miss one.
- Conduct semi-annual audits to assess immunization coverage levels and review records for the clients you serve.
- Participate in your regional immunization registry system (available in St. Louis and Kansas City by the end of 1995).
- Seek out on-going education and training on current immunization practices for yourself and your entire office staff. (This is available through the Bureau of Immunization.)

Get Involved!

GUIDELINES FOR PEDIATRIC IMMUNIZATION: CONTRAINDICATIONS AND PRECAUTIONS

Vaccine	True Contraindications and Precautions	Not True (Vaccines May Be Given)
General (DTP/DTaP, OPV, IPV, MMR, H *influenzae* type b, HBV)	• Anaphylactic reaction to a vaccine contraindicates further doses of that vaccine • Anaphylactic reaction to a vaccine constituent contradindicates the use of vaccines containing that substance • Moderate or severe illnesses with or without a fever	• Mild to moderate local reaction (soreness, redness, swelling) following a dose of an injectable antigen • Mild acute illness with or without low-grade fever • Current antimicrobial therapy • Convalescent phase of illnesses • Prematurity (same dosage and indications as for normal, full-term infants) • Recent exposure to an infectious disease • History of penicillin or other nonspecific allergies or fact that relatives have such allergies
DTP/DTaP	• Encephalopathy within 7 d of administration of DTP • *Precautions**: Fever of ≥40.5°C (105°F) within 48 h after vaccination with a prior dose of DTP • Collapse or shock-like state (hypotonic-hyporesponsive episode) within 48 h of receiving a prior dose of DTP • Seizures within 3 d of receiving a prior dose of DTP (see footnote regarding management of children with a personal history of seizures at any time) • Persistent, inconsolable crying lasting ≥3 h, within 48 h of receiving a prior dose of DTP	• Temperature of <40.5°C (105°F) following a previous dose of DTP • Family history of convulsions† • Family history of sudden infant death syndrome • Family history of an adverse event following DTP administration
OPV‡	• Infection with HIV or a household contact with HIV • Known altered immunodeficiency (hematologic and solid tumors; congenital immunodeficiency; and long-term immunosuppressive therapy) • Immunodeficient household contact • *Precaution**: Pregnancy	• Breast feeding • Current antimicrobial therapy • Diarrhea
IPV	• Anaphylactic reaction to neomycin or streptomycin • *Precaution**: Pregnancy	• None
MMR‡	• Anaphylactic reactions to egg ingestion and to neomycin • Pregnancy • Known altered immunodeficiency (hematologic and solid tumors; congenital immunodeficiency; and long-term immunosuppressive therapy) • *Precaution**: Recent (within 3 mo) IG administration	• Tuberculosis or positive purified protein derivative • Simultaneous tuberculin skin testing∫ • Breast feeding • Pregnancy of mother of recipient • Immunodeficient family member or household contact • Infection with HIV • Nonanaphylactic reactions to eggs or neomycin
H influenzae type b	• See "General" advisories above	• None
HBV	• See "General" advisories above	• Pregnancy

DTP/DTaP = diphtheria-tetanus-pertussis/diphtheria-tetanus-acellular pertussis; OPV = oral poliovirus vaccine; IPV = inactivated polio vaccine; MMR = measles-mumps-rubella; HBV = hepatitis B vaccine; HIV = human immunodeficiency virus; IG = immune globulin

* The events or conditions listed as precautions, although not contraindications, should be carefully reviewed. The benefits and risks of administering a specific vaccine to an individual under the circumstances should be considered. If the risks are believed to outweigh the benefits, the immunization should be withheld; if the benefits are believed to outweigh the risks (for example, during an outbreak or foreign travel), the immunization should be given. Whether and when to administer DPT to children with proven or suspected underlying neurologic disorders should be decided on an individual basis. It is prudent on theoretical grounds to avoid vaccinating pregnant women. However, if immediate protection against poliomyelitis is needed, OPV, not IPV, is recommended.

† Acetaminophen given prior to administering DTP and thereafter every 4 h for 24 h should be considered for children with a personal or with a family history of convulsions in siblings or parents.

‡ There is a theoretical risk that the administration of multiple live virus vaccines (OPV and MMR) within 30 d of one another if not given on the same day will result in a suboptimal immune response. There are no data to substantiate this.

∫ Measles vaccination may temporarily suppress tuberculin reactivity. If testing cannot be done the day of MMR vaccination, the test should be postponed for 4 to 6 weeks.

Courtesy U.S. Department of Health and Human Services/Centers for Disease Control and Prevention.

Be Smart—Store Your Vaccines the Safe Way

Paula A. Rosenberg
Bureau of Immunization

In these days of expensive vaccines, providers must be extra careful about storing their vaccine and ensuring that it stays in good condition. Despite the monetary damage that could occur, the greater tragedy could be that the vaccine becomes damaged and patients are lulled into believing that they are protected from vaccine-preventable diseases.

The following is a checklist, based on Centers for Disease Control and Prevention (CDC) guidelines on vaccine handling and storage practices, to assess your vaccine management practices. Are you doing everything you could to protect your vaccine?

____ Stack your vaccine with air space between stacks to allow cold air to circulate around the vaccine.

____ **DO NOT** store vaccines next to refrigerator walls where coils are located as they could freeze.
The coils are extremely cold and could result in the vaccine being ruined.
Frost-free refrigerators also have a warming cycle that could heat the vaccine, resulting in vaccine damage.

____ Diluent should be stored outside the refrigerator.
It takes up space and does not need to be refrigerated. However, some practices that do not carry large amounts of vaccine may choose to place the diluent in the door of the refrigerator to put less strain on the refrigerator's cooling system.

____ **NEVER STORE VACCINE IN THE REFRIGERATOR DOOR**.
The door panels are not as well insulated as the rest of the refrigerator and could result in higher temperatures and vaccine damage.

____ Assign responsibility for vaccine management to one individual with a backup.
This reduces the number of persons handling the vaccine and provides greater safeguards against mishandling.

____ Develop and conduct training for all office staff.
Vaccine is delicate and costly. Inappropriate handling and usage could result in vaccine that does not provide protection.

____ Invest in a thermometer in order to monitor and maintain records of temperature readings of freezers and refrigerators.
Check and log temperatures at least once a day, preferably twice.
Using a recording thermometer is a good way to monitor temperatures, especially when no readings will be taken on the weekends.

____ Maintain inventory control records to monitor lot numbers and expiration dates.

____ Review all shipments and place vaccines that will expire first towards the front so that they will be used first.

____ Do a hard count inventory once a month to review expiration dates and the status of the vaccines.

____ Do not use expired vaccine.

____ Never store vaccine in facilities with questionable equipment or monitoring capabilities.

____ Install plug guards/protectors.
This helps prevent power loss from accidental unplugging and protects equipment against power surges.

____ Protect and mark circuit breaker switch.
Mark the circuit with neon tape or whatever will get someone's attention that there are perishable vaccines on that circuit. This prevents accidental shutting down of power by maintenance/repair crews.

____ Lock storage facilities and equipment.
This prevents unauthorized removal of vaccine and use of storage for other purposes.

____ Store frozen ice packs in freezer.
This helps maintain the cold chain in the event of a power loss as they remain frozen for several hours.

____ Store bottles of water on the refrigerator shelves next to the walls.
This helps maintain the cold chain and prevents the freezing of vaccine by coils in the walls of the refrigerator.

____ Do not store food or drinks with vaccine.
This eliminates unnecessary opening of the doors, which results in temperature fluctuations.

The Bureau of Immunization will be happy to assist any provider in assessing their vaccine handling practices. Please contact your district immunization representative located in each of the district health offices, or the Bureau of Immunization at (314) 751-6133.

Hepatitis B Vaccine Added to Child Care Immunization Requirements

Marilyn Kemna
Bureau of Immunization

Child care immunization requirements have been changed to include vaccination against one additional disease, hepatitis B.

The Missouri Department of Health Day Care Immunization Rule, which outlines the immunization requirements for attendance and implements 210.003, RSMo (1994), became effective August 11, 1995. The rule applies to public and private day care, preschool, nursery school and Head Start facilities with ten or more children. The immunization requirements were expanded to include hepatitis B for children born on or after January 1, 1990. Thus, attendees are required to be age appropriately immunized for diphtheria, tetanus, pertussis (DTP); polio (OPV or IPV); measles, mumps, rubella (MMR); *Haemophilus influenzae* b (Hib); **and** hepatitis B (HBV).

Requiring hepatitis B for child care attendance brings the immunization requirements into agreement with the Recommended Immunization Schedule established by the Advisory Committee on Immunization Practices (ACIP), the American Academy of Pediatrics (AAP) and the American Academy of Family Physicians (AAFP). It is part of a national plan to eliminate hepatitis B transmission.

Contrary to popular belief, preschool age children can be at high risk for the disease if they are exposed to hepatitis B in the home setting. More than half of the people infected with hepatitis B have no recognizable risk factors and many of those who are infected have no symptoms.

Hepatitis B virus is transmitted through blood or body fluids such as wound exudates, semen, cervical secretions and saliva. Modes of transmission include transfusion of blood or blood products (now rare in the United States as the result of current donor screening practices), sharing or reusing unsterilized needles or syringes, percutaneous or mucous membrane exposure to blood or body fluids and homosexual and heterosexual activity. Hepatitis B virus can survive in the dried state for one week or longer.

Persons exposed as infants or young children are ten times as likely to become infected if unprotected. Of the children who become infected, 85 percent will become carriers and appear to be at higher risk of dying from liver disease than those infected as adults. The risk of chronic infection with hepatitis B virus is related inversely to the age at the time infection occurred.

The hepatitis B vaccines licensed in the United States have a 90–95 percent efficacy in preventing hepatitis B virus infection. Long-term studies of adults and children indicated that immune memory remains intact for ten years or more and protects against chronic hepatitis B infection even though anti-HBs concentrations may become low or undetectable.

Questions concerning the day care immunization rule or hepatitis B virus and vaccine should be directed to the Bureau of Immunization at (314) 751-6133.

REFERENCES:

1. American Academy of Pediatrics. Report of the Committee on Infectious Diseases. Elk Grove Village, IL: AAP, 1994
2. Centers for Disease Control and Prevention. Hepatitis B virus: A comprehensive strategy for eliminating transmission in the United States through universal childhood vaccination (ACIP Recommendations). MMWR 1991;40 (RR-13):1–25.

Legionella Serology Interpretations

Irene Donelon
Bureau of Communicable Disease Control

Legionellosis (Legionnaire's disease) is an illness with acute onset, commonly characterized by fever, cough and radiograph-confirmed pneumonia. Encephalopathy and diarrhea may also be present.

There is often confusion regarding the interpretations of the results of serological tests for *Legionella* antibodies, especially when only a single serum specimen is tested. Correct interpretation of single serum testing can only be done within the context of the patient's clinical presentation. The serological test can only furnish data retrospectively, weeks past the acute stage of illness. It detects and measures the antibody response by the body's immune system to the bacterium that causes Legionnaire's disease. It does **not** determine the current presence or absence of the bacterium in the body. Serological test results indicating a high titer **may** indicate a continued immune response from an exposure or infection which occurred months or years in the past.

The following information may be helpful in interpreting serological test results:

• Titers <1:64 are considered **NEGATIVE**.

• A test result on a single serum giving a titer of ≥1:64, in the absence of clinical illness, generally indicates that the person had exposure to *Legionella pneumophila* sometime in the past. It does **not** mean that the person is a carrier of Legionnaire's disease. In fact, the person with a test result of ≥1:64 may have some level of immunity to the disease.

• A single serum specimen taken during a person's illness must be interpreted as to whether it represents the beginning (acute) low level of antibody or ending (convalescent) high level. From date of disease onset, it generally takes three to six weeks for antibody levels to peak. During that phase in time, antibody levels will normally change from negative (no antibody detected) to positive with high titers of antibody to *Legionella pneumophila*.

• A single serum specimen drawn and tested during the acute phase of the illness is not a reliable diagnostic measure. In a large study of healthy volunteers in Dubuque, IA, 9 percent of the people had a single titer of 1:128, another 4 percent had a single titer of 1:256 and another 0.5 percent had a single titer of >1:512.[1] Therefore, a single high titer is not an uncommon finding, even in healthy persons with no suspected exposure to *Legionellae*. Additionally, as with all serological tests, false positive results often occur.

• Ideally a whole blood specimen should be drawn in the acute phase of the illness (within one week of the date of disease onset) AND a convalescent specimen drawn three to six weeks after disease onset. The first (acute) serum specimen should be stored frozen until the second (convalescent) specimen is drawn. Both specimens should be submitted to the laboratory at the same time. In order to ensure an accurate comparison of titers between the acute and convalescent specimens, the laboratory must test both specimens in the same test run. Demonstration of a fourfold or greater rise in the reciprocal immunofluorescence antibody (IFA) titer to ≥1:128 against *Legionella pneumophila* serogroup 1 is presumptive evidence of acute infection. It should be noted that the sensitivity of serological diagnosis is approximately 80 percent due to false negative test results. Seroconversion occurs in most patients within three weeks after disease onset, but it may take as long as six weeks and some patients with this disease never seroconvert.

• Demonstration of a reciprocal antibody titer ≥1:256 from a single CONVALESCENT-phase serum specimen might be considered diagnostic in patients with a compatible history of illness.

Other accepted diagnostic measures include:

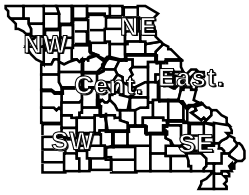
• Demonstration of *L. pneumophila* serogroup 1 in urine by radioimmunoassay. This is the test of choice for a diagnosis early in the patient's illness. There is a short turnaround time for test results and the test is very specific and sensitive for serogroup 1, **or**

• Isolation of *Legionellae* from lung tissue, respiratory secretions, pleural fluid, blood or other normally sterile sites (results on cultures usually take three to six days), **or**

• Demonstration of *L. pneumophila* serogroup 1 in lung tissue, respiratory secretions or pleural fluid by direct fluorescence antibody testing.

REFERENCE:

1. Helms CM, Renner ED, Viner JP, Hierholzer WJ Jr, Wintermeyer LA, Johnson W. Indirect immunofluorescence antibodies to Legionella pneumophila: frequency in a rural community. J Clin Micro 1980;12 (3):326–8.



Missouri Department of Health
Division of Environmental Health and Epidemiology
BIMONTHLY MORBIDITY REPORT

Reporting Period *
July - August, 1995

	Districts							KANSAS CITY	ST. LOUIS CITY	ST. LOUIS CO.	SPGFLD GREENE CO.	2 MONTH STATE TOTALS		CUMULATIVE		
	** NW	NE	CD	SE	** SW	** ED	*** OTHER					1995	1994	FOR 1995	FOR 1994	5 YR MEDIAN
Vaccine Preventable Dis.																
Chickenpox	15	7	20	52	29	0		0	0	0	5	128	251	6276	8093	7596
Diphtheria	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Hib Meningitis	0	0	0	0	0	0		0	0	0	0	0	0	5	4	10
Hib Other Invasive	0	0	0	0	0	0		0	0	0	0	0	9	9	34	35
Influenza	0	0	0	0	0	0		0	0	0	0	0	0	301	163	163
Measles	0	0	0	0	0	0		0	0	0	0	0	0	1	160	1
Mumps	1	0	1	1	0	0		0	0	0	0	3	6	22	31	29
Pertussis	4	2	6	1	1	4		1	0	3	0	22	12	39	29	64
Polio	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Rubella	0	0	0	0	0	0		0	0	0	0	0	0	0	2	1
Tetanus	0	0	0	0	0	0		0	0	0	0	0	0	1	0	0
Viral Hepatitis																
A	177	4	24	10	28	0		54	9	20	2	328	130	934	358	458
B	9	2	5	2	9	1		5	36	8	3	80	105	308	333	333
Non A - Non B	7	1	0	1	1	0		0	1	7	0	18	7	51	15	26
Unspecified	0	0	0	0	0	0		0	0	0	0	0	0	0	0	8
Meningitis																
Aseptic	21	2	7	12	22	0		9	1	11	12	97	47	160	108	136
Meningococcal	2	0	2	0	5	0		0	0	1	0	10	7	44	36	29
Enteric Infections																
Campylobacter	25	5	29	20	16	5		5	3	28	7	143	177	401	447	406
Salmonella	16	2	20	19	16	3		8	2	21	3	110	192	300	406	357
Shigella	45	0	51	15	8	10		11	8	17	7	172	137	627	317	317
Typhoid Fever	0	0	0	0	0	0		0	0	0	0	0	0	0	1	2
Parasitic Infections																
Amebiasis	0	2	0	1	0	0		0	0	1	0	4	7	10	25	19
Giardiasis	11	2	25	18	9	4		2	1	15	12	99	165	330	413	426
Sexually Transmitted Dis.																
AIDS	9	0	5	2	4	10	5	30	42	33	6	146	104	479	501	419
Gonorrhea	55	14	109	73	42	15		572	711	414		2005	2435	7735	8265	9725
Genital Herpes	42	8	51	35	53	39		80	125	179		612	611	2450	2427	2380
Nongonoc. urethritis	7	4	12	21	6	12		348	679	562	6	1657	1083	5838	4085	4870
Prim. & Sec. syphilis	2	0	1	3	0	2		4	72	29	0	113	186	459	722	722
Tuberculosis																
Extrapulmonary	0	1	0	2	1	0	0	2	3	2	0	11	4	32	25	26
Pulmonary	2	1	3	2	5	1	1	7	9	4	1	36	32	128	135	135
Zoonotic																
Animal Bites	237	68	78	141	174	7		1	4	442	25	1177	723	4595	3365	3878
Psittacosis	0	0	0	0	0	0		0	0	0	0	0	2	0	4	1
Rabies (Animal)	0	0	0	0	1	0		0	0	0	0	1	4	19	14	18
Rocky Mtn. Sp. Fever	1	0	4	2	3	0		0	0	0	0	10	7	16	11	17
Tularemia	0	3	2	1	2	0		1	0	0	0	9	7	19	15	21

Low Frequency Diseases

Anthrax
Botulism
Brucellosis
Chancroid
Cholera
Cryptosporidiosis - 17
Encephalitis (infectious)
Encephalitis (viral/arbo-viral)
Granuloma Inguinale
Kawasaki Disease - 1
Legionellosis - 3
Leptospirosis
Lymphogranuloma Venereum
Malaria - 2
Plague
Rabies (human)
Reye's Syndrome
Rheumatic fever, acute
Toxic Shock Syndrome
Trichinosis

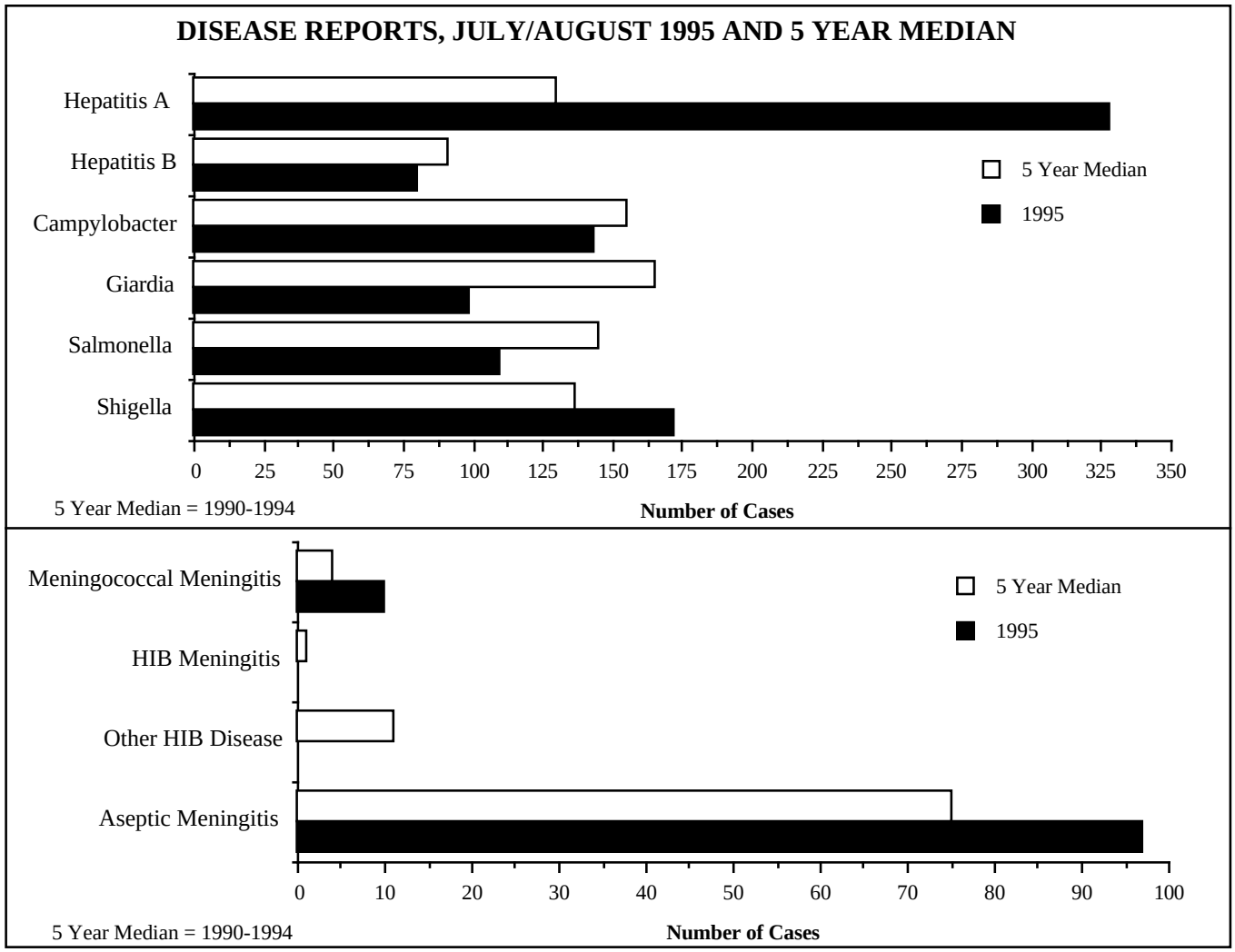
Outbreaks

Foodborne - 3
Pediculosis - 1
Scabies - 1
Other
- Giardia - 1
- Rash - 1
- Salmonella - 2
- Aseptic Meningitis - 2
- Cryptosporidiosis - 1
- Meningococcal - 1

*Reporting Period Beginning July 2, Ending September 2, 1995.
**Totals do not include KC, SLC, SLCo, or Springfield
***State and Federal Institutions

Due to data editing, totals may change.

TEAR OUT FOR FUTURE REFERENCE



VIRAL HEPATITIS

Hepatitis A is still high, the July/August 1995 bimonthly period showed an increase of 152.3%, from 130 cases during July/August 1994 to 328 cases during July/August 1995. The five year bimonthly median for hepatitis A is 130 cases. Hepatitis B cases fell by 23.8% for the bimonthly period, from 105 in 1994 to 80 in 1995. Hepatitis B is 12.1% below the five year bimonthly median for July/August of 91 cases.

ENTERICS

Campylobacter decreased during the time period from 177 cases in 1994 to 143 cases in 1995. This was a decrease of 19.2%. It fell 7.7% from the five year median of 155 cases. Salmonella, at 110 cases, has fallen 24.8% from 192 cases in 1994. This is 24.1% below the five year median of 145 cases. Increases in shigellosis continue to correlate with increases in hepatitis A. Shigellosis increased by 25.5% from 137 cases in 1994 to 172 cases in 1995. The five year median is also 137 cases.

PARASITES

Giardiasis fell by 40.0% from 165 cases during the 1994 bimonthly period to 99 in 1995. The five year median is 165 cases.

MENINGITIS

Aseptic meningitis increased dramatically by 106.4% from 47 cases in 1994 to 97 cases in 1995 bimonthly time period. This is an increase of 29.3% from the five year median of 75 cases. Meningococcal meningitis rose by 42.9% from 7 cases in 1994 to 10 cases in 1995. A rise of 150.0% from the five year median of 4 cases.

HIB DISEASE

No cases of Hib meningitis were reported for the period in 1995 and none in 1994. It is a decrease of 100.0% from the five year median of 1 case. Other invasive Hib disease decreased by 100.0%, from 9 cases in 1994 to no cases in 1995. Other invasive Hib disease was made reportable in 1990 and there is now a July/August bimonthly five year median for other invasive Hib disease. Other invasive Hib disease fell by 100.0% from the bimonthly five year median of 11 cases.

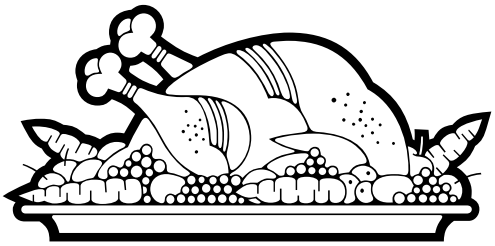
SAFE HOLIDAY MEAL PREPARATION

With the holidays rapidly approaching attention must be given to the proper storing, handling, preparation and cooking of festive foods, so that food poisoning can be prevented. Foodborne disease outbreaks are common at this time of year and can ruin a holiday celebration.

While none of us like to think of our favorite holiday foods as potentially hazardous, many foods are capable of supporting the rapid growth of bacteria that can make us ill. Bacteria will thrive at room temperature in most moist foods that contain protein. Some potentially hazardous holiday foods are: turkey (as well as any other meat or fish), stuffing, gravies (especially those made with giblets or meat drippings), salads (especially those containing eggs or sauces), custard/cream puddings, pies or any food made with milk or eggs.

As the festivities of the holiday season approach, there are several rules for the preparation and storage of your holiday meals that can ensure a safe and happy event.

Good Foodhandling Practices. Wash hands thoroughly with soap and running water before handling food, **and again after touching raw poultry or meat**. Wash all utensils, sinks, counters and cutting boards used to prepare potentially hazardous foods with warm, soapy water before they are used for other foods.



Thawing. Never thaw potentially hazardous foods such as turkey on a countertop at room temperature. They may be thawed in one of four ways: in the microwave, in the sink with cold water (turning turkey and changing water every 30 minutes), in the refrigerator or as part of the cooking process (see table below).

THAWING TIMES

	Refrigerator	Cold Water
8–12 lbs	1–2 days	4–6 hours
12–16 lbs	2–3 days	6–9 hours
16–20 lbs	3–4 days	9–11 hours
20–24 lbs	4–5 days	11–12 hours

Cooking. Use a thermometer to be sure food is cooked well enough to destroy bacteria. Cooking temperatures for potentially hazardous foods vary from 140°F to 165°F. Poultry products such as turkey must be cooked to 165°F at the thickest part. A good rule of thumb to judge the doneness of a turkey: the flesh of the inner thigh should reach 185°F and the juices should run clear. Stuffing the turkey is not recommended. If the turkey is stuffed, however, the thickest part of the stuffing must reach 165°F.

Storage. Shortly after the meal, the turkey should be deboned. The meat and all other potentially hazardous foods should be placed in shallow pans (4" or less in depth) and refrigerated as soon as possible. The shallower the depth of the food, the quicker it will cool, thus slowing bacterial growth.

Don't overload the refrigerator with too many hot foods during a short period of time. The refrigerator will be unable to cool them quickly. It may be necessary to precool hot meat items by placing in plastic bags and placing bags in an ice water bath to cool before placing in refrigerator. Refrigerate potentially hazardous foods immediately to prevent the rapid growth of bacteria. Less hazardous foods (such as raw vegetables, breads, etc.) can be refrigerated later.

Serve hot foods hot and cold foods cold. Maintain the temperature of cold foods at 45°F or colder and hot foods at 140°F or hotter at all times. Never allow any potentially hazardous food to sit out at room temperature for more than two hours. Proper temperatures prevent the rapid growth of bacteria in food.

Reheating. When reheating the leftovers, bring them up to 165°F as quickly as possible, by stirring frequently over high heat.

The USDA booklet, "Talking About Turkey: How To Buy Store, Thaw, Stuff and Prepare Your Holiday Bird," contains a wealth of information regarding the correct preparation and storage of your turkey. It may be obtained by calling the USDA Meat And Poultry Hotline at (800) 535-4555.

Antibiotic Treatment of Adults With Pneumonia Acquired Outside of Acute Care Hospitals

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Community acquired pneumonia (CAP) affects two to four million persons in the United States each year and is the most common lethal infection in this country. From this it can be estimated that 50,000 to 100,000 Missourians are affected annually. The elderly and persons with cardiovascular, respiratory, endocrine and renal diseases account for a disproportionate number of cases and the majority of deaths from CAP. At the opposite end of the disease spectrum, healthy younger persons with CAP are likely to have milder illness that can often be treated with outpatient oral antibiotics with good results. A variety of infectious pathogens can cause CAP and a wider variety of antibiotics is promoted for treatment of this infection. Unfortunately, no single antibiotic covers all pathogens in all types of patients.

The American Thoracic Society (ATS) has published a statement which provides rational guidelines for the treatment of CAP.[1] The crux of the problem is that in clinical practice the pathogen responsible for a case of CAP is identified in significantly fewer than one-half of cases and is rarely known at the time that a therapeutic decision must be made. The clinical features we were all taught that differentiate "atypical" from pyogenic bacterial pneumonias do not reliably distinguish these types because symptoms, signs, laboratory and radiologic features overlap extensively. In particular, *Legionella* pneumonia shares features of both and cannot be diagnosed by clinical presentation.

The ATS recommendations attempt to simplify the empiric therapy of CAP by suggesting antibiotic regimens based on patient characteristics: age, underlying diseases, need for hospitalization and severity of illness. These recommendations are based on the most likely organisms, derived from epidemiologic studies, and the known activities of the antibiotics. Four common presentations of CAP are addressed.

1. Outpatient therapy for CAP in a healthy person under 60 years of age

The most likely causes of CAP in such patients are pneumococci, *Mycoplasma*, *Chlamydia pneumoniae* (TWAR), *Haemophilus influenzae* and viruses. The recommended therapy is an oral macrolide antibiotic (erythromycin, clarithromycin or azithromycin). In patients who are intolerant of macrolides, a tetracycline (doxycycline, tetracycline or minocycline) is recommended.

2. Outpatient therapy for CAP in a patient with a chronic medical condition or older than 60 years of age

The older patient or person with underlying medical conditions may present with a mild illness. In such patients, initial therapy with outpatient oral antibiotics may be attempted. These patients are likely to have infections caused by pneumococcus, *Haemophilus influenzae* or viruses, but are also susceptible to infections caused by *Staphylococcus aureus*, gram negative rods, *Moraxella catarrhalis* and *Legionella.* Recommended oral therapies for such patients include second generation cephalosporins (cefaclor, cefuroxime axetil and others) **OR** trimethoprim/sulfamethoxazole **OR** amoxicillin/clavulanate. In patients in whom *Legionella* is a concern, a macrolide should be given in addition to one of the above. Close follow-up is advisable because about 20 percent of these patients will fail oral therapy and require hospitalization and intravenous antibiotics.

3. Antibiotic therapy for hospitalized patients with CAP

Generally patients who appear ill or toxic, have complicating underlying medical illnesses or cannot comply with oral outpatient therapy will require hospitalization for intravenous antibiotics. Nursing home patients with pneumonia often fall into this category. The most common causes of CAP in these patients are pneumococci, *Haemophilus influenzae*, aspiration, gram negative rods, *Legionella*, *Staphylococcus aureus*, *Chlamydia pneumoniae*, viruses, *Mycoplasma* and *Moraxella*. Recommended regimens are a second (cefuroxime) or third (cefotaxime or ceftriaxone) generation cephalosporin **OR** ampicillin/sulbactam. If *Legionella* is a concern, a macrolide antibiotic should be given concomitantly.

4. Antibiotic therapy for patients with severe CAP

Severe CAP is defined as the patient with multilobe pneumonia on x-ray, signs of shock or respiratory distress (severe tachypnea or hypoxemia). Likely organisms for severe CAP include pneumococci, *Legionella*, gram negative rods (including *Pseudomonas aeruginosa*), *Mycoplasma* and viruses. Recommended regimens are a macrolide **PLUS** an agent with broad gram negative coverage like ceftazidime, imipenem/cilastatin or ciprofloxacin.

Additional considerations

These recommendations are designed for the initial empiric therapy of CAP. If an etiologic diagnosis is obtained, therapy should be directed against the specific pathogen. Conversely, if an etiologic diagnosis is not made and the patient does not improve after two to three days of therapy, additional diagnostic

procedures and a change in antibiotics must be considered. Other etiologic agents and diseases must be entertained such as infections caused by tuberculosis, fungi, viruses or *Pneumocystis carinii*, or noninfectious lung diseases.

The duration of therapy should be determined by the response of the patient and etiologic agent, if one is established. The patient with uncomplicated CAP caused by pneumococci, *Haemophilus influenzae*, *Moraxella* or aspiration, or without a specific diagnosis who responds promptly to therapy, can be treated with seven to ten days of antibiotics (IV and/or PO). In the patient with confirmed or suspected *Legionella*, *Mycoplasma*, *Chlamydia pneumoniae* or complicated bacterial infection, 14 to 21 days of therapy is indicated.

Pneumonia is a common problem in nursing homes. These patients are elderly, have multiple medical illnesses and are prone to aspiration. The most common causes of pneumonia in nursing homes are pneumococci, aspiration of oropharyngeal or gastric contents, and viruses, especially influenza and respiratory syncytial virus. Multiply-resistant bacteria, like aerobic gram negative rods and methicillin-resistant *Staphylococcus aureus*, are problems in areas of heavy antibiotic usage. *Legionella* is another possible cause of pneumonia. The regimens outlined in 2 and 3 above would be appropriate for initial therapy of the nursing home patient with pneumonia.

Streptococcus pneumoniae or pneumococcus is the most commonly identified cause of CAP. Antibiotic-resistant pneumococci have recently emerged as a significant problem. Over the past ten years, the incidence of penicillin resistance has increased 60-fold and in some areas of the United States up to 25 percent of pneumococci are resistant to penicillin and other commonly used antibiotics. However, patients with pneumococcal pneumonia and/or bacteremia usually respond adequately when treated with penicillins. Meningitis or otitis media caused by penicillin-resistant pneumococci are difficult to treat because penicillins do not penetrate these sites in sufficient concentrations to kill these strains.[2] Epidemiologic studies suggest that antibiotic-resistant pneumococci emerge and flourish in settings where oral antibiotics are used heavily and often inappropriately.[2]

Prevention

Most cases of CAP are not preventable. The measures that are available to prevent or modify CAP are inexpensive but are severely under utilized. Pneumococcal vaccine could prevent many cases of pneumonia (including antibiotic-resistant strains) but only about 25 percent of patients who would benefit have received the vaccine. The indications for pneumococcal vaccine are nearly identical to those for influenza vaccine: all persons 65 years of age or older and those with chronic medical conditions. The vaccine is well tolerated, can be given at the same time as influenza vaccine, requires only one shot and is reimbursed by Medicare.

Influenza is a significant cause of pneumonia in the elderly and chronically ill. Influenza virus may cause pneumonia itself and predisposes the patient for secondary bacterial pneumonias. More than 90 percent of deaths caused by pneumonia and influenza are in persons 65 years of age or older. Influenza vaccine is not completely effective in preventing influenza in the elderly, but it markedly reduces the risk for hospitalization and death from influenza. In the elderly or high risk patient, influenza vaccine is highly cost effective and is now reimbursed by Medicare. All elderly and high risk patients should be immunized each fall. In type A influenza outbreaks, treatment with amantadine or rimantadine can prevent disease in unimmunized persons, and may reduce disease severity in infected persons if initiated within 48 hours of the onset of symptoms.

Antibiotic resistance in pneumococci and other bacteria is a growing problem in the United States and elsewhere. Heavy use of oral outpatient antibiotics encourages the emergence and spread of these strains in the community. Much of this use is inappropriate, such as treating viral infections and utilizing newer, more expensive, broad spectrum oral antibiotics.[3] In particular, the quinolone antibiotics ciprofloxacin and ofloxacin are poor choices to treat respiratory infections because of their expense and poor activity against pneumococci, streptococci and mouth anaerobes. Practitioners (and patients) should keep the following issues in mind when prescribing (or requesting) antibiotics:

- Is a bacterial infection likely to be present?
- What are the likely bacteria and what is the likelihood of antibiotic resistance?
- What is the narrowest spectrum antibiotic that will adequately treat the infection?

Attention to these issues now may limit the development and spread of antibiotic resistant bacteria in the future.

REFERENCES:

1. American Thoracic Society. Guidelines for the initial management of adults with community-acquired pneumonia: Diagnosis, assessment of severity, and initial antimicrobial therapy. Am Rev Respir Dis 1993; 148:1418–26.
2. Friedland IR and GH McCracken. Management of infections caused by antibiotic resistant Streptococcus pneumoniae. N Engl J Med 1994; 331:377–82.
3. McCaig LF and JF Hughes. Trends in antimicrobial drug prescribing among office based physicians in the United States. JAMA 1995;273:214–19.

New Prevention Research Center Underway

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St. Louis University School of Public Health

Bert Malone, M.P.A.
Division of Chronic Disease Prevention and Health Promotion

In partnership with the Centers for Disease Control and Prevention (CDC), the St. Louis University School of Public Health and the Missouri Department of Health have teamed up to create a new Prevention Research Center. The new center, housed within the school, is one of only 13 such facilities in the nation. It is funded by the CDC through 1998.

The center's mission is to reduce death and disability from cardiovascular disease (CVD) in a high-risk rural population of Missouri by promoting healthy lifestyles, conducting research and applying research findings locally. The 19-county research area in southeast Missouri, known as the Ozark/Bootheel region, experiences excessively high rates of CVD and accompanying risk factors. Cardiovascular disease mortality rates are almost 20 percent higher than in the rest of the state; smoking and sedentary behavior rates are 18 and 7 percent higher, respectively; yet health resources are limited, with only 9.5 physicians and 41.9 nurses per 100,000 population compared with statewide rates of 21.5 physicians and 84.2 nurses per 100,000 population.

Primary research objectives and interventions target modifiable, lifestyle-related risk factors for CVD: smoking, diet and physical activity. The following core research studies take place in community, primary care and hospital settings:

Community-Based Intervention for Healthy Lifestyles

This study focuses on persons of lower socioeconomic status in a 12-county Ozark area. The study design is quasi-experimental, in which six counties receive the intervention and six serve as comparison counties. In the six "study" counties, local coalitions are trained to deliver community-based interventions and to mobilize the community for policy change. The project also incorporates a network analysis, which identifies communication links affecting coalition efforts.

Computer-Tailored Health Promotion Materials to Reduce CVD Risk Factors in Rural Primary Care Settings

This study evaluates the effectiveness of computer-generated, individualized health promotion materials in helping patients quit smoking, eat less fat and increase exercise. This project targets adult patients who are enrolled in the study from the waiting rooms of four primary care centers in the Bootheel region. Researchers also seek to increase the proportion of providers who counsel patients to quit smoking, change dietary habits and increase physical activity, in recognition of the important role primary care providers play in achieving these goals.

Social Support and Functional Status Recovery in Rural Elderly Stroke Patients

This study examines improvement in functional status following their first thromboembolic stroke as related to type and extent of social support. This study population includes all patients, aged 65 or older, diagnosed with first-ever thromboembolic stroke admitted to participating hospitals in a 23-county region of southeast Missouri. Twenty licensed tertiary care hospitals from the region are expected to participate in the study.

Prevention Policy Promotion in Rural Communities

This study seeks to reduce tobacco sales to minors, increase smoke-free schools, improve school lunches and increase the number of exercise facilities through policy change; this project expands the Bootheel Heart Health Project, a successful community-based intervention.

Future planned projects include training in chronic disease prevention and control strategies for primary care and family practice physicians and nurses, administrators and public health advocates. Eventually, the center plans to expand into cancer and other prevention areas.

For more information, please contact Tricia Guffey, Center Manager, at:

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email: guffeypm@sluvca.slu.edu

Disease Reporting Rules Amended

Disease surveillance is the traditional backbone of public health because it provides information crucial to assessment of the health of our communities, and allows the application of prevention and control measures to curb the spread of disease. Surveillance data helps us detect outbreaks quickly, track incidence trends over time and allocate scarce public resources where they are most needed.

The Missouri Department of Health has recently amended the rules that mandate reporting of certain diseases and conditions (19 CSR 20-20.010 and 19 CSR 20-20.020).

The list of reportable diseases has been significantly revised and condensed from four categories to two. Several diseases have been deleted from the list; other diseases and conditions with newly recognized public health significance have been added to assure consistency with the National Notifiable Disease System developed by the United States Centers for Disease Control and Prevention and the Council of State and Territorial Epidemiologists.

Time frames for reporting have been changed to reflect modern communications methods such as FAX transmission; Category II diseases must now be reported within three days (formerly seven days). Category I diseases must still be reported within 24 hours as immediate action may deter their spread.

The professional groups required to report have been expanded to include nurses, physicians' assistants and institutions, including hospitals and clinics. This expansion reflects ongoing changes in health care practice in the state and the fact that most, but not all, hospitals are already active reporters. Nursing homes are also required to report by rules promulgated by the Division of Aging in 1992 (13 CSR 15-14.042 and 13 CSR 15-15.042). The amended rule specifically states that duplicate reporting by different health care providers in the same institution is not required.

Finally, the amended rule specifies that reporters will not be held liable for reports made in good faith.

The amended rules were filed with the Secretary of State, and were published in the *Missouri Register* on October 16, 1995. The public comment period will extend from that date through November 15, 1995.

Copies of the amended rules are available upon request by calling the Division of Environmental Health and Epidemiology at (314) 751-6079.

State Public Health Laboratory Report

Newborn Screening — Hypothyroidism, Phenylketonuria, Galactosemia and Hemoglobinopathies

James Baumgartner, B.S., M.B.A., Chief, Metabolic Disease Unit

	Jul 95	Aug 95	Total YTD
Specimens Tested	9,992	11,202	80,349
Initial (percent)	63.0%	63.9%	50,952
Repeat (percent)	37.0%	36.1%	29,397
Specimens: Unsatisfactory	157	167	1,208
HT Borderline	794	743	6,549
HT Presumptive	39	27	279
PKU Borderline	12	8	149
PKU Presumptive Positive	1	0	9
GAL Borderline	257	258	1,205
GAL Presumptive Positive	2	0	16
FAS (Sickle cell trait)	80	91	657
FAC (Hb C trait)	18	27	177
FAX (Hb variant)	17	18	105
FS (Sickle cell disease)	1	4	15
FSC (Sickle C disease)	1	0	7
FC (Hb C disease)	3	0	7

HT = Hypothyroidism, PKU = Phenylketonuria, GAL = Galactosemia, Hb = Hemoglobin, YTD = Year to Date

The Missouri Department of Health has developed a new, integrated form for reportable disease notification. A copy of the new form was published on pages 11–12 of the July-August issue of the *Missouri Epidemiologist*.

If you need consultation concerning disease reporting, please call your local health department or the Bureau of Communicable Disease Control at (800) 392-0272.

Development of a Policy to Reduce Perinatal HIV Transmission in Missouri

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In February 1994, results from the AIDS Clinical Trials Group (ACTG) 076 study were announced. These results indicated that giving zidovudine (ZDV, AZT) to a select group of HIV-infected pregnant women and, following birth, to their infants, reduced by two-thirds the risk that the infants would become infected.

The ACTG 076 study[1] was a randomized, double-blind, placebo-controlled trial designed to evaluate the safety and efficacy of ZDV for the prevention of maternal-fetal transmission of HIV. Important points about this study include the following:

- ZDV was given to the pregnant women during pregnancy (beginning sometime after the 13th week of gestation) and at the time of birth, and also to their infants for six weeks after delivery.

- For those mothers and infants who received ZDV, the risk of the infant becoming infected with HIV was approximately **8 percent**, compared to a risk of about **26 percent** when ZDV was not given.

- The HIV-infected pregnant women who were enrolled in the study did not have severely impaired immune systems and most had no prior treatment with antiretroviral drugs. Whether the same reduction in perinatal transmission of HIV with ZDV use which was seen in the study population would also be seen in women with more severe disease and/or who had taken ZDV for lengthy periods of time is unknown.

- Neither the mothers nor the infants in the study showed any significant adverse effects from the ZDV, with the one exception of mild temporary anemia in some infants. Whether other adverse effects could occur remains an important unanswered question; studies to examine this possibility are currently underway.

In August 1994, the Food and Drug Administration (FDA) approved ZDV for use by pregnant women, and the U.S. Public Health Service (PHS) issued guidelines on the use of ZDV to reduce the risk of perinatal HIV transmission.[2] The PHS guidelines, which were summarized in a previous *Missouri Epidemiologist* article[3], include recommendations for the use of ZDV in HIV-infected pregnant women whose clinical situation differs from that of the women included in the ACTG 076 study.

During 1995, two professional organizations and the Centers for Disease Control and Prevention (CDC) issued statements on HIV counseling and testing of pregnant women. The American Academy of Pediatrics recommended routine HIV counseling and routine voluntary HIV testing for all pregnant women.[4] The Council on Scientific Affairs of the American Medical Association, in a report adopted by the House of Delegates at their 1995 Annual Meeting, stated that "it is important for physicians to give a high priority to educating all women about HIV infection and, particularly for those who are pregnant or who may become pregnant, to strongly encourage them to have [voluntary] HIV antibody testing."[5] (In addition, the Committee on Ethics from a third professional group, the American College of Obstetricians and Gynecologists, stated in 1993 that "[o]bstetrician-gynecologists should offer voluntary and confidential HIV testing to all women, with appropriate pretest and posttest counseling."[6]) Finally, CDC has recently issued recommendations calling for health care providers to "ensure that all pregnant women are counseled and encouraged to be [voluntarily] tested for HIV infection . . . ."[7]

HIV Infection and AIDS in Childbearing Women and Women of Childbearing Age in Missouri

The Missouri Department Health (MDOH) has been monitoring the occurrence of HIV infection in the state's childbearing women since November 1988. The average HIV seroprevalence rate in these women over the past four years has been 0.053 percent, or about 5 infections per 10,000 childbearing women. In general, African-American women and women living in the St. Louis metropolitan area have shown the highest rates of infection. Although the HIV seroprevalence rate in Missouri childbearing women has remained generally stable in recent years, and although it is lower than the nationwide rate (17 per 10,000 in 1992), there are still reasons for concern. Childbearing-age women in Missouri are becoming increasingly affected by the HIV/AIDS epidemic, as reflected in the fact that they have consistently been making up a larger proportion of annually diagnosed AIDS cases (slightly more than 8 percent of total cases diagnosed in 1994), and also in the fact that they appear to be making up a larger proportion of more recently infected persons. In addition, heterosexual contact appears to be an increasingly important route for acquiring HIV infection in Missouri, and this will likely lead to an increasing number of women of childbearing age becoming infected.

Development of a Policy to Reduce Perinatal HIV Transmission in Missouri

A comprehensive program to reduce perinatal transmission of HIV, which would be consistent with the previously mentioned recommendations from CDC and the major professional organizations, would likely include each of the following elements:

1. Appropriate education to inform women of childbearing age (including HIV-infected women and pregnant women at risk of infection) of HIV, its means of transmission, and the ways in which this transmission can be prevented. Although the focus here is on the prevention of HIV transmission from an infected pregnant woman to her infant, emphasis must continue to be placed on efforts to help uninfected women (and men) remain uninfected.

2. Availability of prenatal care for all pregnant women, coupled with the provision of appropriate HIV counseling and voluntary HIV testing, so that those women infected with HIV can be diagnosed early in their pregnancy, and thus receive optimal health care and also have the greatest chance to prevent transmission of the virus to their infants.

3. Educational opportunities for health care professionals on the diagnosis and management of HIV disease.

4. Educational opportunities for health care professionals on providing HIV education and counseling to patients. Such training would allow providers to develop more effective communication skills, thus enhancing their ability to educate and counsel their patients, as well as improving their ability to perform proper risk assessment for HIV infection.

5. Availability, and easy accessibility, of comprehensive medical care and other necessary services for HIV-infected women and their children.

Since March 1995, MDOH has been working with its partners in local health departments and HIV Community Planning groups, as well as with HIV-positive women and medical care providers, to develop an effective policy to implement such a comprehensive prevention program. As part of this process, MDOH has been conducting a needs assessment involving pregnant women and HIV-positive women that seeks to gain a clearer understanding of their perceptions regarding HIV counseling, HIV testing and the use of ZDV to reduce the risk of perinatal transmission. In addition, the department is obtaining input from providers on such issues as risk assessment for HIV infection, provision of HIV education/counseling and current needs relative to service coordination.

If you have concerns and/or comments about the recent recommendations from CDC and the various professional organizations, or about the effort by MDOH to develop policies to implement a comprehensive prevention program, please call Beth Meyerson, Chief of the Bureau of STD/HIV Prevention, at (314) 751-6141.

REFERENCES:

1. Connor E, Sperling R, Gelber R, et al. Reduction of maternal-infant transmission of human immunodeficiency virus type 1 with zidovudine treatment. N Engl J Med 1994;331:1173–1180.
2. CDC. Recommendations of the U.S. Public Health Service task force on the use of zidovudine to reduce perinatal transmission of human immunodeficiency virus. MMWR 1994;43(No. RR-11).
3. Recommendations of the U.S. Public Health Service task force on the use of zidovudine to reduce perinatal transmission of human immunodeficiency virus. Missouri Epidemiologist 1994;16(4):7–9.
4. Provisional Committee on Pediatric AIDS. Perinatal human immunodeficiency virus testing. Pediatrics 1995; 95:303-307.
5. AMA Council on Scientific Affairs. Maternal HIV screening and treatment to reduce the risk of perinatal HIV transmission: an update report. CSA Rep. 6-A-95, 1995
6. ACOG Committee on Ethics. ACOG committee opinion: human immunodeficiency virus infection: physicians' responsibilities. Washington, DC: November 1993, No. 130.
7. CDC. U.S. Public Health Service recommendations for human immunodeficiency virus counseling and voluntary testing for pregnant women. MMWR 1995;44(No. RR-7).

Epidemiology and Prevention of Vaccine-Preventable Diseases

The Centers for Disease Control and Prevention (CDC) will present the satellite course, "Epidemiology and Prevention of Vaccine-Preventable Diseases" on four consecutive Friday afternoons this winter. The dates are February 9, February 16, February 23 and March 1, 1996. The course will be sponsored in Missouri by the Department of Heatlh.

For more information about the course, or for site locations, contact the immunization representative located in each of the district offices or the Bureau of Immunization at (314) 751-6133.

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Alternate forms of this publication for persons with disabilities may be obtained by contacting the Missouri Department of Health, Division of Environmental Health and Epidemiology, P.O. Box 570, Jefferson City, MO 65102, (314) 751-6128. TDD users can access the preceding phone number by calling (800) 735-2966.

This newsletter can be recycled.

Tenth Biennial Region VII Cardiovascular Disease Risk Reduction Conference

June 12-14, 1996
Clarion Hotel Carlisle
Omaha, Nebraska

The conference will focus on primary prevention for cardiovascular diseases in the areas of tobacco, nutrition, physical activity and community-based programs. Attention will also be directed towards various cardiovascular disease plans and planning efforts from other states. The conference will provide an update for health professionals about cardiovascular risk reduction and strategies for utilizing public and private partnership in implementing risk reduction programs.

For more information on the conference or for abstracts, contact Sue Dabney at (314) 876-3200.

Planning Committee:
Iowa Department of Public Health; Kansas Department of Health and Environment;
Missouri Department of Health; Nebraska Department of Health;
American Heart Association-Nebraska Affiliate; National Heart, Lung and Blood Institute

Missouri EPIDEMIOLOGIST

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General Guidance Regarding the Use of Antimicrobial Therapy

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How do you use antibiotics?

How do you go about deciding when to start, when to stop or when to change antibiotic therapy?

Textbooks and infectious disease experts have lots to say on the selection of antibiotics, but virtually nothing to say on the **use** of antibiotics.

The overusage of antibiotics includes:

- Using **too many** antibiotics
- Stopping therapy **too soon**
- Using therapy **too long**
- Changing antibiotic therapy **too often**
- Starting **too many** antibiotics

Common errors like these are due to common misunderstandings regarding the nature and purpose of antibiotic therapy (or more properly speaking **antimicrobial therapy**). The misunderstandings or fallacies are the result of using prescribing habits that work well with most other drugs but that do not work well with antibiotics. Why? Because antibiotics are not like other drugs. Before advising you on how to use antibiotics, we would like to begin by reviewing the distinctions between conventional drug therapy and antibiotic therapy. These distinctions are the origin of the five common fallacies of antimicrobial therapy.

The Missouri Department of Health believes the overusage of antibiotics is the primary problem leading to the development and spread of antimicrobial resistance. Antimicrobial resistance is the one thing that threatens to end the effectiveness of these lifesaving drugs. As many readers know, in recent years antimicrobial resistance has lead to cases of untreatable tuberculosis and enterococcal infections.

The information in this article was developed at the University of Missouri–Columbia as an educational guide for physicians and students. Because so many people have found it valuable, the department has decided to offer these guidelines as a structured format for the use of antibiotics. Our intention is that these guidelines should improve the use of antibiotics, particularly in long-term-care facilities and hospitals. This improvement should help limit the spread of antimicrobial resistance. These guidelines are simply guidelines; they are not hard and fast rules and they should not be construed as the official policy or opinion of the Department of Health or the University of Missouri.

The Five Fallacies of Antimicrobial Therapy

Fallacy #1: Antibiotics are supposed to kill "bugs," aren't they?

Actually, with the exception of certain conditions, the purpose of antimicrobial therapy is to slow the spread of infection so that the host defenses can fight off the infection. Most antibiotics are "bacte-

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riostatic" drugs—meaning the drugs inhibit the growth of bacteria but do not kill the bacteria. Nevertheless, in most situations these drugs are highly efficacious. The importance of this concept is the recognition that the therapeutic action of antibiotics is indirect; patient recovery depends first upon host defenses. Antibiotic therapy simply limits the progress of the infection so that the host defenses can gain the upper hand.

The indirect effect of antibiotics is unlike the direct effect of most other drugs. For this reason, many of the therapeutic approaches that work well with direct acting drugs do not apply to antimicrobial agents.

The conditions which require antimicrobial agents to kill bacteria (bactericidal therapy) are endocarditis, meningitis and sepsis in the neutropenic patient. In addition, many clinicians also use bactericidal therapy for treatment of osteomyelitis and undrained abscesses.

Fallacy #2: If a little bit of antibiotic therapy is good, a lot must be better!

While this approach may be highly appropriate for managing blood glucose with insulin or blood pressure with a calcium channel blocker, it does not work with antibiotics. Dose-response curves do not apply to antimicrobial therapy; antimicrobial therapy is either sufficient or insufficient. Enough therapy has to be given to allow clearance of the infection, too little is not enough and too much is excessive. Handbooks, textbooks and the package insert (or *Physicians Desk Reference*) provide guidelines on the appropriate amount of drug therapy.

Fallacy #3: I really don't need to give a full course of antimicrobial therapy.

Most of my patients get better with less than the recommended therapy. This is a common and absolutely correct observation. The problem is when we extend this observation to make the incorrect assumption that you don't really need to give a full course of antimicrobial therapy.

If you have a hundred patients with pneumonia, how many deaths would you consider acceptable? Five? One? None? Most drug regimens are designed to cure 95–99 percent of patients treated; in order to cure nearly all patients we end up over-treating most patients (usually those patients with the strongest host defenses) who would respond to less than the full course of therapy. This over-treatment accounts for the valid clinical observation stated above. Since drug regimens are purposefully designed to include those few patients (usually the sickest and weakest) who require maximal therapy, the problem for the clinician is to accurately predict which patients need maximal therapy and which patients can get by with less. Unfortunately, with a few exceptions, this cannot be reliably predicted. Many seemingly cured patients will relapse if their therapy is cut prematurely short, resulting in additional cycles of antibiotic therapy, inadequately treated infections, clinical confusion and predisposition to the emergence of antimicrobial resistance. For this reason, it is best to give a full course of therapy whenever therapy is instituted.

Fallacy #4: I have started antimicrobial therapy, but the patient has not improved. Shouldn't I change therapy?

Remember, antibiotics act indirectly; in most situations it is the host defenses that are responsible for recovery. Since the host determines the clinical response, by convention[1], we wait at least 72 hours before concluding that the antimicrobial therapy is ineffective. Normally, in the absence of a definitive diagnosis or significant toxicity, you should not change therapy unless it is to add therapy for an important therapeutic omission.

Fallacy #5: My partner (or the infectious diseases consultant, internal medicine consultant, textbook, etc.) says the therapy I started is not the "treatment of choice." Shouldn't I change therapy?

This is a common problem in the medical school setting where we emphasize precision in the selection of antibiotics. The proper question in this circumstance is not whether the chosen therapy is the "treatment of choice" but whether the chosen therapy will be effective against the anticipated infecting microorganisms. If the therapy is appropriate, then it should not be changed. The reason for this is that with appropriate dosing it takes at least four doses of antibiotics to develop the desired blood level and proper blood levels are required before the therapy can be effective. Switching antimicrobial therapy before the desired blood level is achieved only delays the administration of effective therapy. This delay could be crucial in severe infections and could also predispose to the development of resistance.

Remember: *Consistency is better than elegancy and the treatment of choice is treatment.*

After the patient has been stabilized and the infecting microorganisms identified, you should re-evaluate your therapy to decide if it is the best therapy for the patient's infection. The best therapy is the antibiotic with the narrowest spectrum, the least toxicity and the lowest cost.

General Approach to Antibiotic Therapy

The first step in using antibiotics is to record the diagnosis. It seems obvious—but it is often overlooked—that therapy must follow diagnosis. Without a diagnosis, how can we hope to provide the correct therapy? Perhaps because the diagnosis appears too obvious or too elusive, we often forget to write down the diagnosis. The result, however, is

often clinical confusion and the overuse of antibiotics. The diagnosis does not have to be sophisticated, it doesn't even have to be correct, but it is necessary because the entire management of the patient rests on this one point. With a diagnosis, we know how to evaluate a patient, how to choose an antibiotic and what to do if the patient gets better or fails to improve.

Simply stated: *Antibiotic therapy follows diagnosis. Antibiotic therapy should only be used when the patient has a diagnosis of infection. If a patient does not have a diagnosis of infection, antibiotic therapy should not be used.*

The diagnosis of infection actually has two parts or components. These components are important because they guide us in the management of the patient and the selection of the antibiotic. The first component is the organ system involved or the **syndromic diagnosis**. The second component is the most likely infecting pathogen(s) or the **etiologic diagnosis**.

The syndromic diagnosis guides the physician in evaluating the patient. Just saying "pneumonia," "sepsis" or "urinary tract infection (UTI)" brings to mind a series of pathogens for each infectious process. If a physician is uncertain as to the potential pathogens for any given syndromic diagnosis, a variety of textbooks and handbooks can be consulted to clarify the issue. The most likely pathogens for a given infection dictate the choice of antibiotics; all that is left for the physician is to select from the list of effective agents that agent which is the most appropriate for the patient in terms of hypersensitivity, penetration, toxicity, pharmacology and cost.

So that the diagnostic and therapeutic plan can be followed, the order for an antibiotic should always be accompanied by a statement in the progress notes or order sheets that specifies the syndromic and etiologic diagnosis. The diagnosis does not have to be detailed—it may be as simple as "suspect gram-negative nosocomial pneumonia"—but the presence of such a statement is of inestimable value in plotting the medical management of the patient.

When recording the syndromic and etiologic diagnosis, a good habit to follow is to also record the specific signs or symptoms which prompted the diagnosis. In the words of Dr. Meador:[2]

"Know which abnormality you are going to follow during treatment. Pick something you can measure. If there is no abnormality to follow, do not treat with drugs..."

Deciding what abnormality you are going to follow resolves another perplexing and confusing problem inherent in antimicrobial therapy. Simply stated, the problem is as follows: When is it easiest to diagnose an infection like pneumonia? When the patient has a mild nonproductive cough and minimal fever, or when the patient is hypoxic, hypotensive, febrile, producing purulent sputum and has chest pain? Obviously, it would be the latter, but when is it easiest to treat pneumonia? Just as obviously, it would be when the patient has minimal symptoms and signs. This is the diagnostic paradox of empiric antimicrobial therapy. The optimal time for treatment of infection is at its earliest presentation, when the patient is healthiest and the infection is minimal. This is also the time when the infection is most difficult to recognize, when the clinical presentation is the most subtle and the laboratory findings are most likely to be falsely negative. Therefore, superb clinical medicine requires physicians to make the diagnosis of infection when the diagnosis is most difficult to make. Under these circumstances, physicians are likely to forget the subtle signs and symptoms that prompted empiric therapy unless they make an effort to document these findings. Nevertheless, under these same conditions, the patient is most likely to respond to therapy. For these reasons, the following course of events often takes place:

A patient is started on antimicrobial therapy for distinct, but minimal, signs and symptoms. The patient quickly improves, but the physician forgets the patient's presentation that prompted therapy. Faced with a seemingly healthy patient under therapy for an uncertain diagnosis, the physician stops therapy. For many of these patients, the short course of therapy is sufficient and the patient goes on to recovery, but for many other patients the short course of therapy is inadequate, and—to the confusion of the physician—the patient relapses. Recording the signs and symptoms that prompted the diagnosis and therapy helps the physician remember why therapy was started, and it also enables the physician to assess whether the patient has improved, as well as to determine the management of the patient's antimicrobial therapy.

Types of Antimicrobial Therapy

Antimicrobial therapy falls into three categories, each of which requires a somewhat different approach by the physician.

Prophylactic Therapy

The purpose of this therapy is to prevent infections from occurring by treating the exposed patient. Proper treatment requires the physician to make an assessment of risk. In most cases, clinical studies have already determined that certain patients under certain conditions have significant risk and should receive a specific course of antibiotic therapy—for example, patients with significant exposure to *Neisseria meningitidis* or patients facing a hysterectomy. These guidelines are available in handbooks and manuals. In selected situations for which there are no guidelines, physicians may have to use their own judgment in deciding that a patient is at risk because of a recent or anticipated exposure to infecting agents. In these latter cases, the physician should specify the risk and the anticipated (or known) infecting organisms.

With few exceptions, such as *Mycobacterium tuberculosis*, prophylactic anti-

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microbial therapy is only effective if given for a short period of time. With prolonged therapy, the patient becomes colonized with microorganisms that are resistant to the prophylactic agent (and perhaps to other agents); such colonized patients may develop infections that are difficult to treat or may serve as a reservoir for the contamination and infection of other patients and personnel. For these reasons, prophylactic therapy should be limited to 48 hours or less.

Definitive Therapy

Patients whose infecting microorganism has been identified should receive definitive therapy. This therapy should be "narrow spectrum," which means that as far as possible the antimicrobial agent should be inactive against other microorganisms. The value of narrow spectrum therapy is that it has limited impact on other microorganisms, minimizing both the emergence of antimicrobial resistance and the disturbance to the patient's microflora. Firm guidelines for the choice, dose, duration and route of antimicrobial therapy are usually available in handbooks, manuals and textbooks.

Empiric Therapy

The decision to start empiric antimicrobial therapy is based upon an assessment of "risk." The patient may be at risk because of a severe infection (like pneumonia or sepsis) or because of compromised host defenses (like asplenia or neutropenia). Since the infecting organism is unknown, the choice of antibiotic therapy in empiric therapy requires the physician to anticipate the infecting microorganism. For this reason, empiric therapy is usually "broad spectrum" therapy. Unfortunately, no matter how broadly designed, no single antimicrobial agent or combination of agents can effectively cover all the infectious possibilities. Therefore, antimicrobial therapy has to be directed toward specific microorganisms. This is done in the following manner (in order of importance):

- Results of gram stains and other rapid diagnostic smears and assays;
- Prior culture data (when available);
- Epidemiologic data or clinical setting (the who, when and where of illness); and
- Codified clinical experience (available in handbooks, manuals and textbooks).

Empiric therapy is a clinical trial in which the physician makes a clinical diagnosis and treats the patient based upon the diagnosis. The response of the patient (getting better or getting worse) determines the course of the trial. In conducting this trial, the physician should allow at least 72 hours[1] (longer in compromised patients) before concluding that the antimicrobial therapy is ineffective.

The astute physician will recognize that the preceding could involve the logical error known as "*post hoc ergo propter hoc*."[3] This error is the assumption of a causal association between an event and a preceding action; specifically, the patient's condition after antimicrobial therapy. In fact, the recommendations are based upon the recognition that the patient's apparent "response" to therapy is not proof of the nature of his/her illness; nevertheless, this "response" can serve as a guide to management. The ensuing comments describe the rationale of this approach.

Following microbial therapy, the patient will either improve, decline or have an indeterminate response.

1. If the patient improves, it may be because the diagnosis was correct and the patient was correctly treated, or because the diagnosis was incorrect but the patient spontaneously recovered. Whether the clinical diagnosis was correct or incorrect in this situation is not pertinent to the patient's continuing care because the patient has recovered. The physician should simply recognize that the diagnosis was a presumptive diagnosis and could be in error. On the other hand, given the clinical circumstances, there is a high probability that the diagnosis was actually correct and the patient was responsive to therapy. Because physicians are uncertain of the clinical diagnosis, they often waver in their commitment to continuing therapy. Under these circumstances, it would be wrong to deprive the patient of a potentially successful course of therapy simply because the physician is uncertain of the diagnosis. *Bad diagnosis does not equal bad therapy.*

2. If the patient fails to improve, it may be because the diagnosis was correct but there was a problem in the management of the patient, or because the diagnosis was incorrect in the first place. Recommendations for the management of both possibilities were given above.

3. Finally, the physician may not be able to decide whether the patient has improved or declined on antimicrobial therapy. For these circumstances, recommendations are given for daily reassessment and—if the indeterminate response continues—an end-point to therapy is suggested.

The goal of the physician during a course of empiric therapy should be to confirm the clinical diagnosis by cultural isolation of the infecting organism(s) and to, thereby, convert empiric therapy into definitive therapy. If the patient improves on therapy, but an etiologic diagnosis cannot be made, then the patient should still receive a full course of therapy as indicated by the clinical diagnosis.

Remember: *A poor diagnosis does not deserve poor therapy!*

If, during a successful course of empiric therapy, the patient develops a reaction to the antimicrobial agent, then the agent should be stopped and a new agent substituted which will be effective against the suspected pathogens. The new agent should then be used until the completion of the planned therapy. If at any time an alternative diagnosis is made to explain the patient's presentation, then empiric therapy should be stopped. If, after 72 hours of therapy, the patient has failed to improve, then the physician should conduct a comprehensive re-evaluation. In

re-evaluating the patient, the physician should consider the following:

- Failure of therapy may be due to a complication such as: persistence of infection due to obstruction of drainage, abscess formation or foreign body; superinfection; alteration in the host micro-ecology (like pseudomembranous colitis); secondary (nosocomial) infection; or drug fever.[4]
- Failure of therapy may be due to therapeutic malfunction such as: a lapse in administration of the antimicrobial agent, the wrong dose of the antimicrobial agent, the wrong interval of antimicrobial therapy, the wrong route of antimicrobial therapy, poor penetration of the antimicrobial agent to the site of infection, genotypic resistance, or drug incompatibility or antagonism.[4]

If failure is not due to a complication or therapeutic malfunction, then the physician should consider the following possibility:

- Failure of therapy may be due to diagnostic error, such as the wrong diagnosis of infection or the emergence of concomitant disease.

In this case, the appropriate response is to stop the empiric therapy, re-evaluate the patient and start a new course of empiric therapy if indicated.

In some patients, the physician may not be able to decide whether the patient has truly improved or failed to improve. The physician may also believe that in these patients the risk of stopping antimicrobial therapy is greater than the risk of continuing therapy. In such instances, it is reasonable to continue therapy on a day-by-day basis, re-evaluating the patient in a comprehensive manner every day. If, after a full course of therapy, the patient's response is still uncertain, then—with one exception—the therapy should be stopped. The exception is that for drug-induced neutropenic patients, therapy should be continued until the patient has recovered from the neutropenia.

REFERENCES:

1. Hughes WT, Armstrong D, Bodey GP, et al. Guidelines for the use of antimicrobial agents in neutropenic patients with unexplained fever. J Inf Dis 1990;161:381–96.
2. Meador CK. A little book of doctor's rules. St. Louis, MO: Hanley & Belfus, Inc, 1992.
3. Kim JH, Gallis HA. Observations on spiralling empiricism: Its causes, allure and perils, with particular reference to antibiotic therapy. Am J Med 1989;87:201–6.
4. Gardner P. Reasons for antibiotic failures. Hosp Pract 1976:41–45.

Bureau of Environmental Epidemiology Emergency Response Involvement—Nuclear Power Plants

Gary McNutt
Bureau of Environmental Epidemiology

There are two nuclear power plants that could impact Missouri in the event of an incident resulting in radioactive releases to the environment. Callaway Nuclear Power Plant is located in Callaway County about 20 miles from Jefferson City. It is owned and operated by Union Electric Company. Cooper Nuclear Power Station is located at Brownsville, Nebraska, on the banks of the Missouri River directly across from Atchison County. Cooper is owned and operated by the State of Nebraska.

Because of the many safety features associated with their construction and operation, the probability of an incident involving the environs outside the exclusion area of a nuclear facility is extremely low. However, the possibility does exist and there is a need for contingency planning to insure that existing capabilities are effectively used to minimize the effects if such an incident should occur. Specifically, there is a need for planning to protect the public from the effects of radioactive gases, vapors or particles vented into the atmosphere, or radioactive liquids discharged into the waterways as a result of incidents occurring at the nuclear facility.

Emergency preparedness and planning is related to two Emergency Planning Zones (EPZ's) with related radiation exposure pathways. EPZ's are defined as areas for which planning is needed to assure that prompt and effective actions can be taken to protect the public in the event of an accident. The first EPZ is the Plume Exposure Pathway. This is an area of about ten miles radius of the facility with the principal exposure being whole body external radiation exposure from the radioactive release (plume) and from deposited material and inhalation exposure from the passing radioactive plume. The second EPZ is the Ingestion Exposure Pathway. This is an area of about 50 miles radius of the facility with the principal exposure from ingestion of contaminated water or foods such as milk, fresh vegetables or aquatic foodstuffs.

It is the responsibility of the Department of Health, Bureau of Environmental Epidemiology, to direct operations specifically related to nuclear radiation affecting the environs outside the bounds of the nuclear facility. This responsibility includes nuclear radiation monitoring, determination of need of implementing protective actions, advising other agencies regarding actions that should be taken, determination of individual exposure levels and determination of the need for decontamination. It

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Hepatitis A in Food Establishments

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"Your salad preparer has been diagnosed with hepatitis A!" These words can strike fear in the heart of any restaurant owner, and with justified cause. Such an announcement can mean illness to customers, the potential for legal action against the restaurant, poor public relations and the eventual demise of the business. For these reasons and the press coverage that may ensue, health professionals and the public may arrive at misconceptions about the proportion of hepatitis A cases traceable to an infected foodhandler employed in a food service establishment. This article is an attempt to clarify what is known about hepatitis A cases in foodhandlers and public health efforts to prevent secondary cases.

From January–December 1995, preliminary Missouri data indicate hepatitis A cases increased by 104.2 percent over the same period in 1994 (1,264 vs. 619 cases). Whereas 33 of the 619 cases in 1994 were either employed as foodhandlers or in food manufacturing, 62 of the 1,264 cases in 1995 were employed as such. Although no 1995 cases have been traced to an infected foodhandler, national surveillance data indicate that five to seven percent of reported cases are related to recognized food or water outbreaks. This percentage is relatively small when examining other sources of exposure; however, it is important as approximately 40 percent of cases cannot identify the true source of their exposure to hepatitis A.

The cost of preventing transmission of hepatitis A from an infected foodhandler to the public includes, among other major expenses, the cost of providing immune globulin (IG) to persons within 14 days of exposure. This cost of IG varies considerably with each foodborne exposure, but ranges from approximately $654 to $8,031. This is calculated using $7.77 per person ($3.27 per dose of IG and $4.50 for administration). Since 1987, nine occasions met the criteria established by the Centers for Disease Control and Prevention to make a public announcement that exposure may have occurred at a specific restaurant during a specific time period. Considering the number of restaurant investigations conducted that were related to hepatitis A-infected foodhandlers, the need for public announcements is uncommon because of delayed case reporting, being too late for IG administration and not meeting the given criteria. Nevertheless, the cost of giving IG to co-workers of infected foodhandlers, which is routinely done in all cases, amounts to many dollars if one calculates 10–20 co-workers per infected foodhandler. For 1995, the cost to Missourians is estimated to have been $4,817 to $9,548 ($7.70 per dose x 62 cases x 10–20 co-workers).

Why is hepatitis A such a problem for restaurants and other food handling businesses when there are other exposures to hepatitis A? We know that the virus does not exclusively reside in a certain population of persons called foodhandlers; there are other groups affected as well. In fact, there is some evidence that suggests the virus is readily transmitted among preschoolers and that child-care centers can serve as a major hepatitis A reservoir to the rest of the community by person-to-person transmission. However, when a hepatitis A case is identified in a commercial foodhandler, there is considerable expenditure of public health effort focused on preventing a common source outbreak because of the potential for widespread transmission within the entire community.

Foods usually involved in these common source outbreaks are foods handled by an infected worker and not receiving further heat treatment after handling. This makes salads, raw vegetables and sandwiches with raw garnishes particularly suspect as vectors of the virus, and they are often the involved foods in an outbreak.

Although a foodhandler is infected and can be infectious for a period up to two weeks prior to and two weeks following onset of symptoms, it does not mean that a common source outbreak will automatically occur. Since the virus is only shed in the feces, it takes the violation of several controls to bring the food into contact with fecal material. Foodhandlers who do not practice good hygiene and who do not properly wash their hands after eliminating body wastes are the ones who thwart the efforts of the establishment and the health department in serving safe food to customers. In spite of health department requirements to: 1) limit food handling; 2) protect food from contamination; 3) store food at temperatures that inhibit bacterial growth; and 4) provide handwashing sinks with soap and disposable towels in restrooms and food processing areas, the virus can still contaminate the food by neglecting to wash hands.

Just how to change this process that endangers both people and businesses continues to be debated in public health circles today. There is discussion of the mandated use of single-service plastic gloves, prohibition of bare-hand contact with ready-to-eat foods, double handwashing with the use of a nail brush, and required vaccination of foodhandlers with the newly developed hepatitis A vaccine (Havrix). Although any of these proposed interventions could be effective in eliminating the spread of hepatitis A in foodhandling establishments, the present requirements mentioned above are highly effective when they are followed by the foodhandler.

The key to any successful intervention is education and motivation, and this requires a concerted and cooperative effort between the food industry and the food safety regulators. Without such an effort, we will continue to investigate potential foodborne exposures to hepatitis A virus in an effort to prevent the common source outbreaks that could occur.

Missouri Department of Health
Division of Environmental Health and Epidemiology
BIMONTHLY MORBIDITY REPORT

Reporting Period *
September - October, 1995

	Districts							KANSAS CITY	ST. LOUIS CITY	ST. LOUIS CO.	SPGFLD GREENE CO.	2 MONTH STATE TOTALS		CUMULATIVE		
	** NW	NE	CD	SE	** SW	** ED	*** OTHER					1995	1994	FOR 1995	FOR 1994	5 YR MEDIAN
Vaccine Preventable Dis.																
Chickenpox	60	48	18	48	43	0		0	0	0	0	217	421	6495	8514	8158
Diphtheria	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Hib Meningitis	0	0	0	0	0	0		0	0	0	0	0	0	7	4	14
Hib Other Invasive	1	1	0	0	0	0		0	0	2	0	4	4	14	38	38
Influenza	0	0	0	0	0	0		0	0	0	0	0	0	302	163	163
Measles	0	0	0	0	0	0		0	0	0	0	0	0	1	160	1
Mumps	1	0	0	0	0	0		1	0	0	0	2	7	23	38	35
Pertussis	3	0	2	1	3	1		1	0	2	0	13	10	45	39	97
Polio	0	0	0	0	0	0		0	0	0	0	0	0	0	0	0
Rubella	0	0	0	0	0	0		0	0	0	0	0	0	0	2	1
Tetanus	0	0	0	0	0	0		0	0	0	0	0	1	1	1	0
Viral Hepatitis																
A	84	4	19	2	18	2		27	10	6	3	175	165	1132	523	550
B	14	1	1	0	4	0		4	6	2	2	34	85	339	418	418
Non A - Non B	3	0	1	0	0	2		0	3	7	0	16	4	65	19	28
Unspecified	0	0	0	0	0	0		0	0	0	0	0	0	0	0	9
Meningitis																
Aseptic	12	0	5	8	11	3		3	2	15	6	65	41	234	149	233
Meningococcal	0	0	1	0	2	1		0	0	3	0	7	4	52	40	32
Enteric Infections																
Campylobacter	6	3	22	7	15	8		4	3	13	3	84	103	500	550	535
Salmonella	10	3	18	29	13	13		10	9	19	1	125	130	448	536	466
Shigella	57	0	16	15	2	27		3	2	33	3	158	84	810	401	401
Typhoid Fever	0	0	0	0	0	0		0	0	1	0	1	0	1	1	2
Parasitic Infections																
Amebiasis	0	0	0	0	0	0		0	0	0	0	0	5	11	30	23
Giardiasis	28	8	28	8	14	24		16	15	35	12	188	196	543	609	625
Sexually Transmitted Dis.																
AIDS	11	3	9	8	1	7	7	42	41	20	11	160	120	639	621	567
Gonorrhea	62	13	75	56	44	14		560	578	332		1734	2060	9469	10325	12433
Genital Herpes	25	13	56	33	55	20		84	71	154		511	501	2961	2928	2928
Nongonoc. urethritis	25	8	9	14	4	8		256	434	454	5	1217	1014	7055	5099	5876
Prim. & Sec. syphilis	0	0	0	4	0	1		0	41	18		64	115	523	837	837
Tuberculosis																
Extrapulmonary	1	0	0	1	0	0	0	0	0	2	1	5	9	37	34	34
Pulmonary	1	1	0	2	3	1	0	7	4	3	3	25	38	153	173	173
Zoonotic																
Animal Bites	177	44	58	117	128	10		1	2	405	30	972	501	5802	3866	4716
Psittacosis	0	0	0	0	0	0		0	0	0	0	0	0	0	4	1
Rabies (Animal)	0	0	0	2	1	0		0	0	0	0	3	6	22	20	27
Rocky Mtn. Sp. Fever	2	0	0	0	1	0		0	0	0	1	4	5	23	16	24
Tularemia	0	0	0	0	4	0		0	0	1	0	5	7	24	22	29

Low Frequency Diseases

Anthrax
Botulism
Brucellosis
Chancroid
Cholera
Cryptosporidiosis - 10
Encephalitis (infectious)
Encephalitis (viral/arbo-viral)
Granuloma Inguinale
Kawasaki Disease - 2
Legionellosis - 2
Leptospirosis
Lymphogranuloma Venereum
Malaria - 2
Plague
Rabies (human)
Reye's Syndrome
Rheumatic fever, acute
Toxic Shock Syndrome - 2
Trichinosis

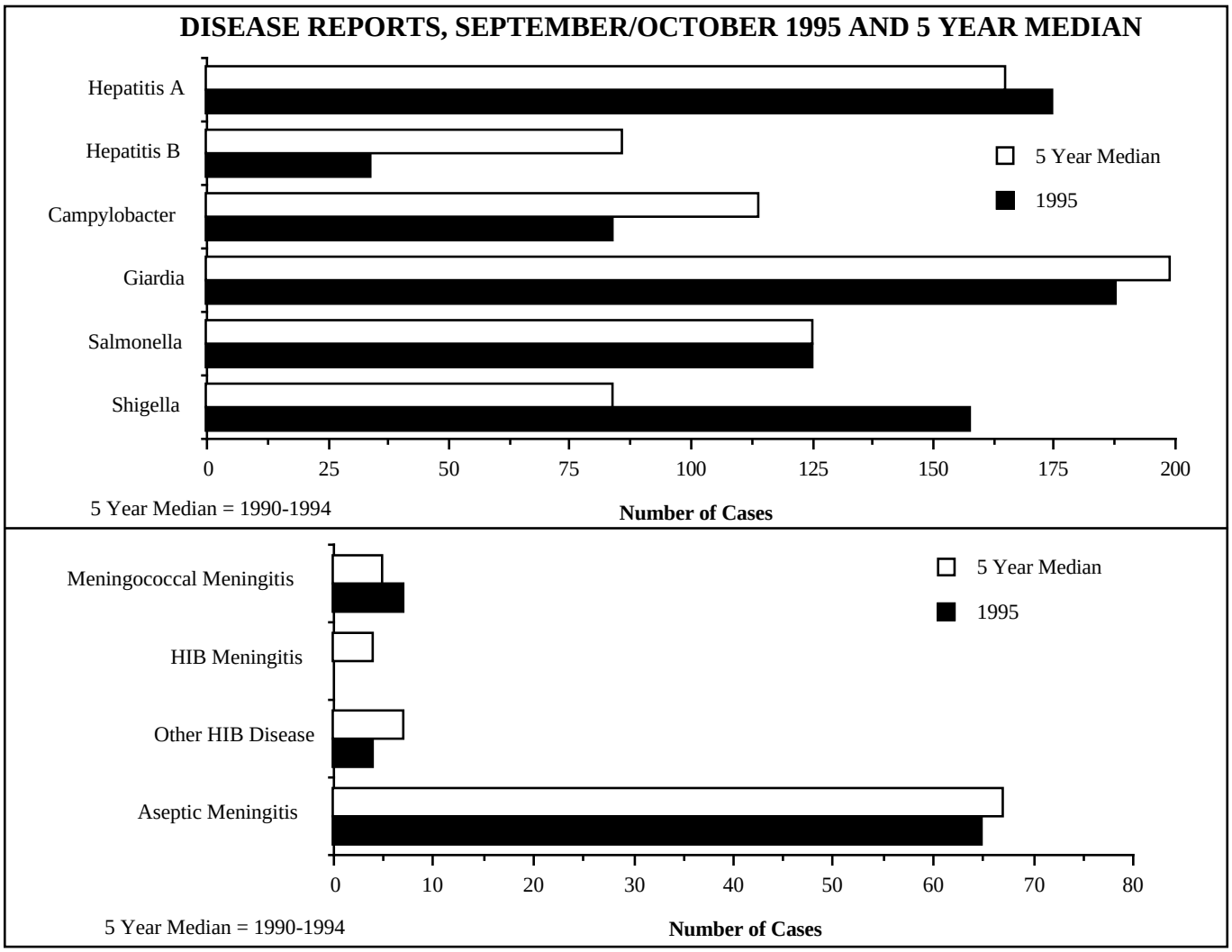
Outbreaks

Foodborne - 3
Nosocomial - 4
Pediculosis - 1
Scabies - 4
Other
Giardia - 1
Shigella - 1
Salmonella - 1
Diarrhea - 1
Pneumonia - 1

*Reporting Period Beginning September 3, Ending October 28, 1995.
**Totals do not include KC, SLC, SLCo, or Springfield
***State and Federal Institutions

Due to data editing, totals may change.

TEAR OUT FOR FUTURE REFERENCE



VIRAL HEPATITIS

The September/October 1995 bimonthly period showed an increase of 6.1%, from 165 cases of hepatitis A during September/October 1994 to 175 cases during September/October 1995. The five year bimonthly median for hepatitis A is 165 cases. Hepatitis B cases fell by 60.0% for the bimonthly period, from 85 in 1994 to 34 in 1995. Hepatitis B is 60.5% below the five year bimonthly median for September/October of 86 cases.

ENTERICS

Campylobacter decreased by 18.4% during the time period, from 103 cases in 1994 to 84 cases in 1995. It fell 26.3% from the five year median of 114 cases. Salmonella, at 125 cases, has fallen by 3.8% from 130 cases in 1994. The five year median is 125 cases. Shigellosis increased by 88.1% from 84 cases in 1994 to 158 cases in 1995. The five year median is also 84 cases.

PARASITES

Giardiasis fell by 4.1% from 196 cases during the 1994 bimonthly period to 188 in 1995. It fell by 5.5% from the five year median of 199 cases.

MENINGITIS

Aseptic meningitis increased by 58.5% from 41 cases in 1994 to 65 cases in the 1995 bimonthly time period. It fell by 3.0% from the five year median of 67 cases. Meningococcal meningitis rose by 75.0% from 4 cases in 1994 to 7 cases in 1995. A rise of 40.0% from the five year median of 5 cases.

HIB DISEASE

No cases of Hib meningitis were reported for the period in 1995 and none in 1994. It is a decrease of 100% from the five year median of 4 cases. Other invasive Hib disease had no change from 4 cases in 1994 and 1995. Other invasive Hib disease was made reportable in 1990 and there is now a September/October bimonthly five year median for other invasive Hib disease. Other invasive Hib disease fell by 42.9% from the bimonthly five year median of 7 cases.

Polio Immunization Recommendations

On October 18, 1995, the United States Department of Health and Human Services Advisory Committee on Immunization Practices (ACIP) met to develop a new strategy for the prevention of poliomyelitis in the United States. While the strategy is being reexamined, **the current recommendations for polio immunization remain in place**.

Changes in the current strategy for polio immunizations are being examined because of the near eradication of polio in the Western Hemisphere and because of the occurrence of vaccine-associated paralysis. However, polio immunization must continue until the disease is eradicated from the globe. The threat of international importation of the polio virus remains real. In order to continue to provide protection in the event of international importation, the ACIP has made a preliminary recommendation to examine a combined schedule of inactivated polio vaccine (IPV) and oral polio vaccine (OPV).

It is important to note that the final preferred schedule and recommended number of doses to be administered has not been finalized. In addition, the manufacturer of IPV will need time to produce the vaccine in sufficient quantities to support its increased use.

The Missouri Department of Health continues to support the current ACIP schedule for polio protection. The ACIP recommends an initial three doses of OPV (unless conditions calling for IPV are identified) at 2 months, 4 months and 6 months of age. An additional booster dose should be administered after the fourth birthday.

IPV and OPV are both effective in preventing poliomyelitis. However, when the benefits and risks for the entire population are considered, OPV is the vaccine of choice for primary immunization of children in the United States. OPV is preferred because it produces intestinal immunity, is simple to administer, results in immunization of some contacts of vaccinated persons and has a record of having essentially eliminated disease associated with wild polioviruses in the Western Hemisphere.

The current recommendation is that e-IPV be used when there are adults who have not been previously immunized, children with immunodeficiencies or household contacts with immunodeficiencies. This vaccine, administered as an injection, provides protection, but does not produce as much local immunity in the intestines where polio incubates. Parents should be made aware of the different vaccines available and the reasons why they are preferred. The benefits and risks of the vaccine for individuals and the community should be stated so that the immunization is carried out among persons who are fully informed.

If you have any questions regarding polio vaccination, or immunizations in general, please contact your immunization representative located in each of the Department of Health district offices or the Bureau of Immunization at (800) 219-3224.

National Infant Immunization Week
April 21–27, 1996

National Infant Immunization Week (NIIW) provides an opportunity to highlight and enhance the impact of existing immunization efforts. NIIW activities can help increase awareness of age-appropriate immunizations, enhance existing partnerships and attract new partners who can participate in long-term education efforts.

Numerous activities are being planned in various parts of the state to promote NIIW. The Child Immunization Coalition of St. Louis is sponsoring a Spring Immunization Conference on Wednesday, April 24, from 12:00 p.m. to 3:00 p.m. at the Junior League of St. Louis. The Centers for Disease Control and Prevention (CDC) will provide the keynote speaker. Continuing education credit will be requested.

For more information, contact your immunization representative located in each of the Department of Health district offices or the Bureau of Immunization at

(800) 219-3224

Hypothermia Mortality in Missouri 1985–95

H. Denny Donnell, Jr., M.D., M.P.H.
Office of Epidemiology

Bitterly cold weather is a significant hazard to life in our nation and in Missouri. The Centers for Disease Control and Prevention report that in the United States about 780 persons die each year from cold exposure and about half of these are age 65 and over. Unfortunately, this also occurs in Missouri where we have averaged 13 deaths per year from hypothermia during the past ten winters, of which 46 percent have been elderly persons. See Figures 1 and 2. This emphasizes a need to be very supportive of persons at highest risk, and especially so with increasing age.

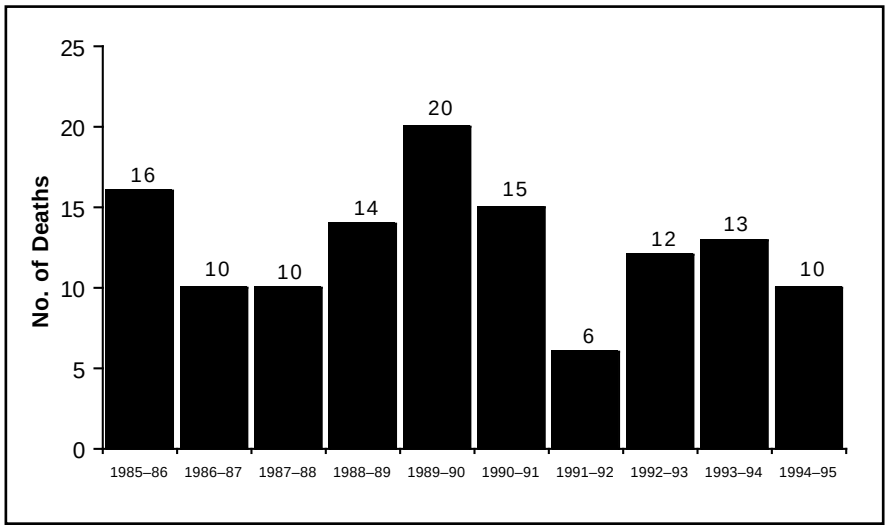


Figure 1. Hypothermia deaths, Missouri, 1985-86 to 1994-95.

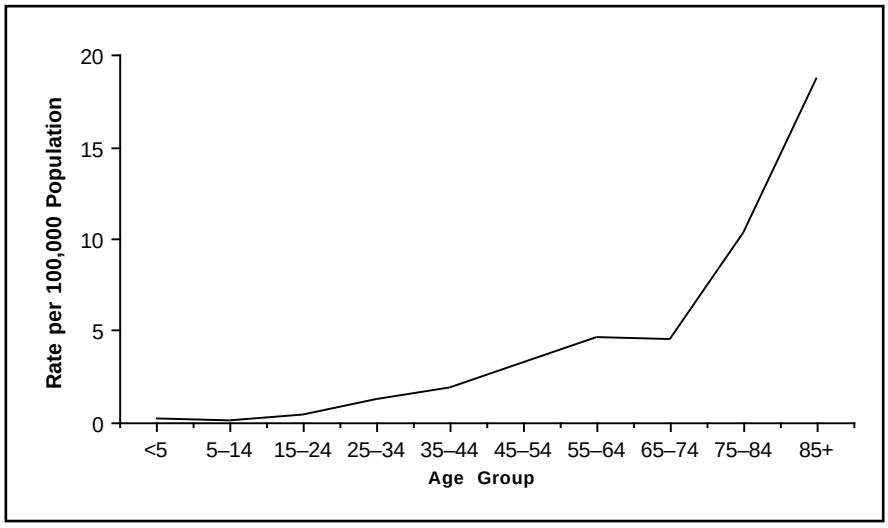


Figure 2. Hypothermia death rates per 100,000 population by age group, Missouri, 1985-86 to 1994-95.

Hypothermia occurs when the body temperature falls below 95˚F or 35˚C. Early and mild symptoms include shivering, slurred speech, mental slowness and lethargy, muscular stiffness and clumsiness. Symptoms of severe hypothermia include mental confusion, disorientation, stupor or coma, absence of shivering, stiff or rigid muscles, shallow and very slow breathing, weak pulse and fall in blood pressure. If symptoms of hypothermia are detected, immediate medical attention is warranted.

The elderly, who are often homebound and bedfast, are particularly vulnerable to hypothermia due to having less fatty tissue insulation, impaired shivering mechanism, lower metabolic rates, chronic illnesses, limited mobility and less perception of the cold. They may also be trying to reduce expenditures on heating and may gradually get so cold that their body temperature falls below a critical level, and even at temperatures well above the freezing mark, they quietly die.

The very young are also highly vulnerable to hypothermia, but society protects them well (babies should have sleeping rooms maintained at temperatures that feel comfortable to you and should have multiple layers of clothing and blankets that do no restrict the baby's breathing or movement).

The homeless and disadvantaged are at greater risk for hypothermia. Other risk factors associated with injury and death from the cold include alcohol use, certain illnesses and some medications that affect the nervous and vascular systems.

Illnesses that may adversely affect a person's response to cold temperatures include:

- Hypothyroidism and other disorders of the body's hormone system.
- Stroke and other disorders that cause paralysis or reduce awareness.
- Severe arthritis, Parkinson’s disease and other illnesses that limit activity.
- Any condition that reduces the normal flow of blood.
- Memory disorders.

Medications reported to contribute to core temperature depressions include: Acetaminophen, Atropine, Barbiturates, Benzodiazepines, Bethanechol, Bromocriptine, Butyropherones, Chloral hydrate, Clonidine, Cyclic antidepressants, Glutethimide, Lithium, Morphine, Nicotinic acid, Organophosphates, Phenformin, Phenothiazines, Reserpine and Tetrahydrocannabinol. Physicians are encouraged to inform patients regarding medications that affect body heat.

Increased awareness is the most effective way to prevent and treat hypothermia. Doctors, nurses and health professionals—including those working in emergency rooms—must remember to check for hypothermia.

Hypothermia became reportable by law in Missouri effective April 8, 1993. The Department of Health routinely maintains surveillance on hypothermia by asking local health departments to rapidly forward information on cases to the state level where they can be compiled weekly or more often in times of extreme cold. Physicians are urged to report cases of hypothermia promptly to their lcoal health departments.

Remember these important facts:

- Hypothermia is a drop in body temperature to below 95°F (35°C).
- Older people are at risk of hypothermia not only in cold weather, but in mildly cool temperatures as well.
- Hypothermia affects older people more often than younger people.
- Alcoholic drinks, certain illnesses and some medications can affect the body's ability to regulate temperature.
- A person suffering from hypothermia is often confused, sleepy or can have slurred speech.
- Hypothermia is dangerous and requires immediate medical care.

Tuberculosis Awareness Fortnight

Each year the American Lung Associations of Eastern and Western Missouri, along with the Missouri Department of Health, Bureau of Tuberculosis Control, co-sponsor Tuberculosis Awareness Fortnight. This upcoming event is scheduled to take place March 10–23, 1996.

Further information on planned activities will be published in the next issue of the *Missouri Epidemiologist*.

If you have questions or want to obtain literature on tuberculosis, please contact:

American Lung Associations
of Eastern and Western Missouri
(800) LUNG-USA
or
Bureau of Tuberculosis Control
(573) 751-6122

Nuclear Power Plants

(continued from page 5)
is also the responsibility of the Department of Health to provide advice to the Governor through the State Emergency Management Agency (SEMA) and to local Emergency Operation Centers concerning decisions affecting protective responses.

In the event of a radioactive release to the environment, Bureau of Environmental Epidemiology personnel will perform assessments of radiological aspects of the incident including trend plotting, analysis and evaluation of data for purposes of radiation protection. Initial assessment will consist of evaluation of information and dose projections provided by the facility. Subsequent assessment will include evaluation of that information as well as data from field monitoring, and available dosimetry data, changes in meteorological conditions and any additional or revised data from the facility. The need for implementing protective actions will be determined by population dose projections.

Annual exercises and drills are performed at each plant as refresher training for emergency workers. Bureau of Environmental Epidemiology staff are involved in each of these exercises. A federally evaluated exercise was held on October 18 at the Callaway Nuclear Power Plant. Participants were graded by federal evaluators on performance and their ability to function under simulated emergency conditions. These exercises are a very important part of maintaining an adequate response capability.

While the chance of an incident occurring at either plant is remote, Bureau of Environmental Epidemiology staff are constantly working to improve their ability to adequately protect the public health and safety of the approximately 800,000 people in Missouri who may potentially be affected by an accident or incident at nuclear power plants.

If you have questions about emergency preparedness and planning as it relates to nuclear power plants in Missouri, please contact the Bureau of Environmental Epidemiology at (573) 751-6102.

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The Managing Editor is H. Denny Donnell, Jr., MD, MPH, State Epidemiologist, assisted by Bill Schmidt, MPH, Director, and Mahree Skala, MA, Deputy Director, of the Division of Environmental Health and Epidemiology. Diane C. Rackers is the Production Manager. Questions or comments should be directed to (573) 751-6128 or toll free (800) 392-0272

Alternate forms of this publication for persons with disabilities may be obtained by contacting the Missouri Department of Health, Division of Environmental Health and Epidemiology, P.O. Box 570, Jefferson City, MO 65102, (573) 751-6128. TDD users can access the preceding phone number by calling (800) 735-2966.

This newsletter can be recycled.

Health Requirements for International Travel

The Centers for Disease Control and Prevention (CDC) offers two publications on the health recommendations and requirements for international travel.

Health Information for International Travel offers specific recommendations for vaccination and disease prophylaxis including malaria, geographical distribution of potential health hazards and health hints for travelers. This 200-page, annual publication is for sale by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402, (202)512-1800. It is also available at the U.S. Government Bookstore, Bannister Mall, Kansas City MO, 64137, (816) 765-2256 for $14. The stock number is 017-023-00195-7. The most recent edition was printed August 1995.

Since it is impossible for an annual publication on international travel to remain absolutely current, CDC offers a useful bi-weekly publication which can be used in conjunction with the above book. The "Summary of Health Information for International Travel," also known as the "Blue Sheet," which lists areas infected with cholera, yellow fever and plague. Subscriptions to the Blue Sheet are available to health departments, physicians, travel agencies, international airlines, shipping companies, travel clinics and other private and public agencies that advise international travelers concerning health risks they may encounter when visiting other countries. The Blue Sheet is available by dialing CDC's fax information service at (404) 332-4565.

Information from these publications or CDC memoranda may also be obtained by calling the Bureau of Immunization at (573) 751 6133.

A final resource is CDC's telephone hotline for international travel, which is (404) 332-4559. This line offers information by voice recording as well as fax.

Vaccines and International Travel

An opportunity will be available in 1996 to enhance your knowledge of the prevention of cholera, yellow fever, Japanese encephalitis, typhoid and other diseases of importance to world travelers. The Centers for Disease Control and Prevention (CDC) will be offering the satellite video conference, Vaccines and International Travel, Friday, March 8, 1996, 11:00–2:30 p.m. CST. For more information about the video conference, or for site locations, contact your immunization representative located in each of the district offices or the Bureau of Immunization at (573) 751-6133.